EDUCATION

DEVOTED TO THE SCIENCE, ART, PHILOSOPHY, AND LITERATURE OF EDUCATION.

VOL. X. OCTOBER, 1889. No. 2.

A NATIONAL UNIVERSITY.—A STUDY.[1]

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EDUCATION in the United States has experienced within the last century a rapid growth and a remarkable development. Many circumstances have been favorable and many unfavorable. The early settlers of this country from Europe were generally of hardy and vigorous races, intelligent, ambitious, many of them possessing high attainments and strong character. Several of the English colonies early manifested a broad interest in learning, with rare good judgment appreciating the fact that a new country especially must depend greatly for its success upon the intelligence of the masses and the higher education of the learned professions. The public school system of New England dates back almost to the beginning of the several settlements. The Boston Latin School was founded in 1635, Harvard College in 1636, and a tax was laid by the town of Dorchester for the support of a public school in 1639. Jefferson's plan, which he advocated at an early day, was that the state should take control of the higher and secondary education while the elementary education should be carried on by local taxation and private philanthropy. The general public school system, supported by tax upon the inhabitants of the state and the towns, gained a strong foothold quite early in the history of the eastern and northwestern states. Since the reconstruction of the southern states after the close of the late war, every one of these states has established and put in operation a

[1] A paper read before the National Educational Association at Nashville, July 17, 1889.

system of public schools. We have, therefore, today, a well established system of public instruction for the masses of children which furnishes a good elementary education, in every state and every territory of this country, except Alaska, and there the system in a modified form has lately been put into operation by the President. The general diffusion of the elements of learning among all the people is the pride and boast of this republic. In our political system we have reached so near to universal suffrage that it has been easily apparent to all that the stability of the state absolutely demands the general intelligence of all the people. The large number of newspapers, especially the dailies, the immense circulation of the great magazines and other periodicals, together with an unprecedented quantity of books issued from the American press, — especially within a few years past, — are significantly indicative of the strong fact that we are emphatically a reading people. There is possibly no other nation today where the elements of an education are so generally diffused, or where all classes of the people do so much general reading.

These statements are trite and commonplace. They are disputed by none, but admitted by all. They are mentioned here for the purpose of laying a basis for several deductions later on. When we turn to the secondary and the higher education we find their history no less remarkable. Harvard College was established in 1636, William and Mary in 1693, Yale College in 1700, the College of New Jersey in 1748, the University of Pennsylvania in 1749, Columbia College in 1754, Brown University in 1765, Dartmouth College in 1770, Rutgers College in 1771, Hampden-Sidney College in 1775. Prior to the revolution, then, the thirteen infant colonies had established ten colleges. In Massachusetts alone the following, which may be termed academies, were established before 1800, and are in successful operation to this day: —

The Boston Latin School, established in 1635; Elliott School, Jamaica Plain, 1691; Dummer Academy, South Byfield, 1763; Phillips Academy, Andover, 1778; Leicester Academy, Leicester, 1784; Derby Academy, Hingham, 1785; Westford Academy, Westford, 1792; Lawrence Academy, Groton, 1793; New Salem Academy, 1795; Bristol Academy, Taunton, 1796; Deerfield Academy, Deerfield, 1799.

The history of academies in this country makes a chapter of profound interest to all educators. Within the last forty years in

many sections of the country, especially in New England, the academies have in very many instances given place to the public town high school. The establishment of this public high school has marked an important era in the development of the higher education. While it is true that evolution of education is necessarily from above downwards, from the college to the ancient "grammar" school, and from that to the "dame" school, yet the reflex influence is also well marked. The establishment, in Massachusetts or in Michigan, of a vigorous public high school in every considerable town largely increases the number of students in the colleges.

The foundation and growth of the colleges of America also furnish many lessons of importance to the student of education. Not merely is the foundation of the colleges in the colonial period to be noticed, but the rapid establishment of colleges and so called universities in the newer northwest reflects great credit upon the intelligence and enterprise of the pioneers. The latest report of the commissioner of education, 1886–7, names three hundred and sixty-one colleges of liberal arts, including twenty-four state universities, thirty-three schools of science endowed with the national land grant, and thirty-two not endowed with a national land grant. In addition should be mentioned seven colleges for women. This makes a total of four hundred and thirty-three collegiate institutions in this country. The number of academies and other secondary schools for both sexes given in the commissioner's report is five hundred and fifty-one, the number for boys alone two hundred and thirteen, for girls alone one hundred and seventy-two, of similar schools supported wholly by public funds, four hundred and nineteen, and institutions for the superior instruction of women, one hundred and fifty-two, making a total of fifteen hundred and seven, provided some of these are not reckoned twice. With all these various classes of institutions for the higher and secondary education — not to mention the professional schools, and their name is legion — and with our total of twelve million children, or nearly so, in schools of all grades, it might almost be said that we are a nation composed of schoolmasters, schoolma'ams and school children.

During the last twenty-five years vast strides of improvement have marked the progress and development of our schools, seminaries, and colleges throughout the country. Compulsory laws

have been enacted, the length of the school year has been increased, the qualifications of teachers have been raised, normal schools have to a marked degree elevated the character of the teachers and the teaching, methods have been decidedly improved and special attention has been given on all hands to the study of the principles of psychology and didactics.

But among all the points indicating growth, progress, development and improvement, none is more striking than the ever increasing attention paid to scientific subjects. The study of natural science, especially of physics and chemistry, has made marvellous improvement and produced astonishing results. The application of science to inventions, especially to inventions of labor-saving machines and new methods of communication and transportation is without parallel in the history of the world. The business of the United States Patent Office is simply gigantic. Possibly in no other way may the improved and increased educational facilities be more thoroughly tested or more accurately measured than by the patent office. I am not unobservant of the advance made of late in Johns Hopkins, Harvard, Yale, Cornell, Michigan, and other colleges. Indeed, the college curriculum in general has been decidedly improved and elevated, but all this does not meet the requirements of the case. Something more and higher is imperatively demanded.

Within the last twenty-five years it has become more and more apparent that the great need of this country educationally is in the way of advanced learning. Relatively, we have primary schools enough, and grammar schools enough, and possibly enough of the secondary schools, — if they were only better, — and surely we have colleges and universities enough and to spare. But what means Cornell University, and Johns Hopkins University, and now what means Clark University? The establishment and the remarkable success of Johns Hopkins University at Baltimore are strongly indicative of the absolute necessity of pushing our American education forward into new fields, and upward to more elevated plateaus. It is a common remark and notoriously true, that in America the elements of education are more widespread than in Europe, yet the higher education of the old world is far in advance of anything to be found with us. Moreover, our situation and our circumstances are such, our necessities, our needs, our opportunities, that precisely the reverse of this ought to be true. Do not

lose sight of the fact that this is a very large country. It is energetic, enterprising, wealthy, and fast becoming populous. There is a greater demand, a stronger necessity today with us for higher knowledge, deeper insight, a more thorough study and apprehension of all branches of knowledge and learning than exists in any other nation under heaven. We could today utilize to a greater degree than any other people, profound researches in nature, in art, in the humanities. There is no department of the higher education which is not needed today by our people to be pushed to its utmost limit. In how many cases do the aimless searchings after truth among us remind one of a staunch vessel, strong and well equipped, drifting in mid ocean, without a pilot, without a chart, without a compass, even without a rudder. In natural science — including all its departments, in history, in classical learning, in philology, in the useful arts and the fine arts, in law and medicine and divinity, in telegraphy, in telephony, in telephoty, in social science, especially economics and civics, in all the range of the metaphysics, and in fine, in every department of human learning, thought and investigation, there is a marked necessity for higher study and higher instruction than this country has yet produced.

Pause a moment with me to observe a few of these crying necessities. With all the advance which we have made in the study of natural phenomena, there is yet no man living who understands the theory of storms; no man living who can satisfactorily explain the ocean currents; nobody has yet discovered a satisfactory explanation of the tides; no complete, rational theory of medicine exists, but we are still tied down largely to empiricism. Psychology is based on physiology, but no one yet comprehends the relations and the action of the two lobes of the brain and the two sets of nerves. No satisfactory theory is yet agreed upon with respect to bacteria and the germs of disease in general, epidemics, epizoötics, and the like. No man has yet arisen who can successfully untie and untangle the knots and snarls which Adam Smith, more than a century ago, pushed out before the learned men of the world, and over which they have ever since been quarreling. Our politicians and our statesmen are still discussing with great vigor and force the question of protection and free trade, mono- and bi-metalism, of state rights and national unity, of home consumption and foreign commerce, national subsidies and natural currents of trade, and possibly they are now as far from an agreement as ever.

It is not to be expected that any one panacea can be discovered, or any one patent medicine can be compounded which will free the body politic from all these ills and all this ignorance that the nation is heir to, but the question is a fair one, and certainly one of great importance, whether it is not possible by proper means and reasonable efforts to diminish to a considerable extent the difficulties and dangers here pointed out.

The success of Johns Hopkins University has been phenomenal. It has given opportunities for a higher standard of scholarship than we before possessed. It has helped to elevate the work of all the colleges, but it has also served to show clearly the necessity of still further advances. What is needed now is an institution far beyond Johns Hopkins. The liberality of wealthy Americans has been so great as almost to make it seem that it had no limit, but it certainly is not without limit. It can hardly be expected that private munificence will be able to establish a university in this country with sufficient means to perform adequately the service required in the higher realms of learning. We are therefore shut up to the necessity of having this needed institution established by the whole people as represented by our national government. That, and that alone, will be able to accomplish this great work.

Such an institution as is needed ought to be endowed with productive funds to the extent of, at least, two hundred million dollars. This at three per cent. interest would bring an annual income of six million dollars. If the government of the United States should set apart this amount of its bonds for this specific purpose, to be kept at interest, so that there might be a reliable permanent annual income of at least six million dollars, the problem of the much needed higher development of profound learning would at once be on the way towards a solution.

The first question in the discussion of a proposition of such proportions deals with the ability and the advisability of the national government to make and endow such an establishment. There is an opinion, more or less prevalent in every community, that our national government had better not meddle with educational matters. It is true that the national government, as such, is not committed to any general system of education, because it was the policy of the framers of our constitution to leave in the hands of the states and the people of the states all rights and duties which did not seem necessary to be conferred upon the national government.

The general government has, however, in various ways committed itself to the cause of education. In addition to setting apart the 16th and 36th sections of each township for educational purposes, appropriations of land in the newer states have been made for state universities. Fifty years ago a surplus fund of about thirty millions of dollars had accumulated in the national treasury. This surplus revenue was distributed, by an act of Congress, among the states then existing. Many of the states set apart their share of this fund for school purposes. The government has maintained at its own expense, a military academy at West Point, for the education of army officers; a naval academy at Annapolis, to educate officers for the navy; a college for deaf mutes at Washington; a school for instruction in the signal service at Fort Whipple, Va., near Washington; and Congress has from time to time during later years done much for the education of the Indians. It has, especially of late, made liberal appropriations for the excellent schools for the Indian youth now maintained at Hampton, Va.; Carlisle, Pa.; Salem, Ore.; Santa Fe, N. M.; and other places. It has maintained common schools at various military posts, and the President has lately established a system of education for the territory of Alaska. It has established and has for many years maintained with great profit to the nation, a Bureau of Education, which by the collection of statistics and the publication of useful circulars of information, has done much to elevate the general status of education.

The founders of the republic were strongly impressed with the necessity of a national university. Washington, in his last will and testament, made a liberal bequest "towards the endowment of a university to be established within the limits of the District of Columbia under the auspices of the general government," and he said that "the accomplishment of the object [will be] obtained, I have not the smallest doubt, before many years pass away." In making his bequest, Washington thus clearly and fully sets forth his views concerning a national university: "It has always been a source of serious regret with me to see the youth of these United States sent to foreign countries for the purpose of education, often before their minds were formed, or they had imbibed any adequate ideas of the happiness of their own; . . . . . for these reasons it has been my ardent wish to see a plan devised, on a liberal scale, which would have a tendency to spread systematic ideas

through all parts of this rising empire, thereby to do away with local attachments and state prejudices, as far as the nature of things would, or indeed ought to admit, from our national councils. Looking anxiously forward to the accomplishment of so desirable an object as this is (in my estimation), my mind has not been able to contemplate any plan more likely to effect this measure, than the establishment of a university in a central part of the United States, to which the youths of fortune and talents from all parts thereof might be sent for the completion of their education in all the branches of polite literature, in the arts and sciences, in acquiring knowledge in the principles of politics and good government; and, as a matter of infinite importance in my judgment, by associating with each other, and forming friendships in juvenile years, be enabled to free themselves in a proper degree from those local prejudices and habitual jealousies, which have just been mentioned, and which, when carried to excess, are never failing sources of disquiet to the public mind, and pregnant with mischievous consequences to this country."

The project has from time to time been entertained and plans proposed by many of our greatest writers, most profound thinkers, and wisest statesmen. It was discussed at length by this Association at Elmira and Detroit, in 1873 and '74. Several articles of great value have lately appeared in our magazines. Some of our most eminent educators, like Ex-President White of Cornell University, Dr. William T. Harris, and others, have discussed the subject with great ability. No valid objections against the general idea have yet been made. The great difficulty has been to devise a plan sufficiently well defined and free from objectionable features which would seem feasible, and especially a plan so formed as to insure its perpetuity, entirely freed from politics, political parties, jobbery and fluctuations, thereby ensuring a wise and steady and permanent management. I shall content myself in the remainder of this paper with the purpose without quoting from authorities, plainly and concisely, and I trust intelligently, to set forth a plan on which it has seemed to me possible for the government to establish a national university which should meet the wants of this great country, and elevate to a high degree good learning in every desirable direction with the wisest and happiest results.

I. PERMANENT INVESTED FUNDS.

According to the census of 1880, the estimated true valuation

of the property in the United States was forty-three thousand six hundred and forty-two million dollars. The estimated true value in 1870 was thirty thousand sixty-eight million five hundred and eighteen thousand five hundred and seven dollars. These figures show an increase of forty-five per cent. in ten years. Doubtless the wealth of the country has increased during the present decade fully as much. This estimate would give for the entire true valuation of the property of the country in 1890, sixty-three thousand two hundred and eighty million dollars. If the government should set aside for the purpose of a national university two hundred millions, it would be equivalent to an assessment of less than one-third of one per cent. on the estimated true valuation of the property of the country. Please bear in mind that this is not to be an annual assessment, but this appropriation, once for all, of two hundred million dollars would be the permanent endowment of this great university. This endowment could be effected without any direct tax, by turning over to the trustees of the university that amount of government bonds. It is estimated that this sum would be ample for all purposes for a long period of years. The institution must be a growth. It must begin with a few students, and increase year by year in numbers and in the breadth of the instruction. Should the institution succeed in accomplishing what it is confidently believed it would accomplish, then fifty years hence, more or less, if a larger endowment was required it could be made with the greatest ease. At that time there would be, doubtless, no difficulty, should the amount be needed, in raising this endowment to five hundred, or even a thousand million dollars.

II. THE SCOPE OF THE UNIVERSITY.

I do not think there would be sufficient reasons for establishing by the government a national college of the ordinary type. The state universities and the large number of colleges established in the several states by private munificence are sufficient for the needs of the people. If the proposed national university were to be modeled after the plan of Harvard or Yale, Cornell or Ann Arbor, or even Johns Hopkins, it had better not be founded. The purpose and scope of such an institution should be for higher and broader work than can now be done in any existing institution. Its object should be largely for original investigation. It should, in many departments at least, aim primarily to reach out

to the unknown. Its standard should be higher than that of any institution in the world. It should have no undergraduate courses, but all of its work should be above and beyond the ordinary college curriculum. The institution should be closely connected with the Smithsonian Institution; the National Museum; the Bureau of Lighthouses; the Geological Survey; the Coast Survey; the Department of Agriculture; all scientific investigations of the department of the navy, such as deep sea soundings, ocean currents, tides and the like; the weather bureau; the congressional library, and all other departments of the government where the connection would be mutually advantageous. It should include the Bureau of Education, the work of which should be broadened and strengthened.

III. ITS COURSES OF STUDY.

The plan for such a university as here contemplated proceeds on the supposition that the funds at its disposal from year to year are amply sufficient to allow its members and fellows to pursue lines of study for any number of years, even through a lifetime.

(a.) *In Natural Science.* The lines of study to be pursued in this university in the department of natural science should include the higher realms of investigation in geography, physics, chemistry, meteorology, zoölogy and natural history, physiology, biology, botany, astronomy, — including especially the investigation of the laws and phenomena of the solar system and various lines of study in relation to the fixed stars, nebulæ, and theories of the universe; and special studies in whatever direction might seem, from time to time, wise to undertake. In mentioning the foregoing list, classification of the sciences is not intended, but only to call special attention to certain lines and topics which seem especially to need investigation.

(b.) *The Mathematics.* Here the effort should be to push this branch of study, like all other branches, to the farthest limit. The higher mathematics, algebra, geometry, trigonometry, analytical geometry, the calculus, the mathematics of the earth, e. g., its quantity of matter, weight, size, diameter, circumference, absolute length of a degree of longitude at different latitudes, absolute length of a degree of latitude from the equator to the poles, systems of measurements, etc., astronomical mathematics with all its varied applications in different directions, and in short the study

and investigation of any and every department of mathematical enquiry which might seem wise, necessary or useful.

(c.) *Language Study.* Under this head should be included the greatest facilities for the study of every language, ancient or modern, that might seem desirable, and to such an extent as might seem desirable; the literature of all nations and of all times; all questions of profound inquiry into the Latin and the Greek languages and literatures, the investigation of intricate and disputed questions concerning modern or ancient languages, and all branches of the study of philology.

(d.) *History.* Here is a branch of learning which is even now but beginning to be developed and pursued scientifically. Instruction should be given in the philosophy of history, the laws of history, the history of nations and peoples, with special reference to the causes and accessories of their development, growth, strength, and decay; the characteristics of races; the influences of climate; the effects of institutions, and in fine the general laws and philosophy of the development of mankind. Special attention should be paid to the study of our own history and to the types of mind necessary for successful historians and the underlying laws and principles that should govern the writing of any history, bearing in mind the practical advantages which would accrue from the introduction of better and more scientific methods of studying and writing history.

(e.) *The Metaphysics.* In this department should be elaborated the best methods of study and of teaching the most profound philosophy of all metaphysical inquiry. An historical investigation should be early made into the various leading schools of philosophy in the past, their strength, their weaknesses, and their influence upon human thought. Farther analysis here is unnecessary.

(f.) *Social Science.* Under this head might perhaps be included the study of economics, civics, labor and capital, penal and reformatory institutions, the state and education, and many other subjects which need not be specifically mentioned.

(g.) *The School of Law.* There should be connected with this institution a department for the study of law, which should include a more scientific and complete investigation of the underlying principles of this important line of human inquiry than has ever before been attempted. The department of international law

should be made prominent. The principles of arbitration and peaceful settlement of international difficulties should be elaborated. The principles of common law and of the various branches of law practice as applicable to business and to the development of the state should receive special consideration. The history of the leading systems of law, ancient and modern, should be carefully studied. Improvements in our codes should be suggested. There should be a school of diplomacy for instruction in the principles and duties of statesmen, foreign ministers, consuls, etc.

(h.) *The School of Medicine.* It should not be the province of the school of law in this institution to make lawyers, but to study the intricate questions of the higher range of topics relating to the fundamental principles and practices especially in reference to their bearing upon national and governmental matters. Nor should it be the province of the school of medicine to fit young men for the ordinary practice of the healing art, but to develop a higher range of thought and knowledge and work along the line of specialties in which so great advance and improvement have been made of late, particularly in the schools of the old world. In connection with the medical department of the army and navy there should be furnished in this institution the best facilities for this study which the world can afford. Suppose that one man, or ten men, should devote their entire lifetime to the study of bacteria, what important results might be among the possibilities. What might not such an institution have done for Jacksonville.

(i.) *Engineering.* In connection with the corps of engineers in the army there should be furnished in this institution the best facilities for the study of the highest range of thought and practice in railroad engineering; mining engineering; topographical engineering; bridge building; and every part of this practical and useful science and art. The matter of river and harbor improvements by the general government might be placed under the care of this institution.

(j.) *The Science of Warfare.* It is possible that the military school at West Point and the naval school at Annapolis might be made departments of this institution, receiving thereby great advantages and without transferring the immediate control from the departments of the army and the navy. Or, the West Point cadets — such as might be the best qualified — might, after graduating, go to Washington to study for professorships. In addition

to these schools there might be established courses of lectures and study for superior army officers, and perhaps others, for the investigation of advanced modes of carrying on war whenever the necessity may arise.

(k.) *The Weather Bureau.* This bureau of the government should become a part of the national university and form a regular department in its study and work. The most learned professors which the world affords should here give instruction and pursue investigations in this intricate science.

(l.) *The Census Bureau* should be a permanent department under this university, and there should be in connection therewith a well organized bureau of statistics.

The foregoing list of branches for study and for investigation are in no sense designed to be scientifically arranged or to be exhaustive and complete, but they have been introduced only for the purpose of giving a general idea of the plan and scope which might characterize such an institution. All that is intended to be conveyed in this direction is simply the fact that if our government should establish a national university, it should be the principal design and aim of such an institution to investigate in the broadest and deepest manner possible all branches of higher learning, and to carry this investigation to the farthest possible limit. I have not mentioned the study of the fine arts, music, painting and sculpture, although they might perhaps as well be included as any of the courses named. The civil service bureau, and from time to time other new bureaus should be added to this university. Indeed, there seems to be no good reason why the courses of study should not be co-extensive with the limits of human thought and investigation.

This is not the place or the time to discuss the problem of the education of women. It would seem plain, however, that a great national university like that here advocated, should not ignore the claims of woman to a superior education, and should not omit to make provision for the highest intellectual elevation of woman in this country. There are at least many branches of study, if not all, to which she should be invited. The recent death of Professor Maria Mitchell, the eminent astronomer, emphasizes the right and the necessity to make proper provision for woman in such an institution. The details, however, must necessarily be left to the wisdom of the board of trustees.

IV. ITS PLAN OF ORGANIZATION.

I am not unaware of the fact, that concerning every one of the topics here discussed there will naturally be found very different opinions and views from those here given. I am only aiming to express, as clearly as I may, the plan which lies in my mind. I do not anticipate that this scheme will be at once adopted by our government, nor do I even ask the approval of this association. My sole object is a desire to present for further thought and general consideration a broad plan such as, if carried out, might be found of great advantage to the country. It has seemed to me that the following might be not an unwise plan for its organization, and every one will see at a glance that this would give us the greatest and broadest educational institution in the world. It should be established by the United States government. It should be at once placed upon an independent financial basis. Its funds should be two hundred million dollars. The entire amount should be invested as permanent funds, with an unchangeable provision that only the income of the whole amo nt should be used. Of course, it would require several years to get such an institution into full working order, and during these years the income of six or seven millions each year would be sufficient to erect and equip the proper buildings and furnish the necessary apparatus. These buildings should be located in Washington. It were better to have them on government lands, although this is not essential. It might be thought advisable to have branches in the various sections of the country for experiments and the study of agriculture, floriculture, arboriculture, and for the study of the flora and fauna in the different latitudes. It has already been said that the university should be beyond the reach of politics and political influence. For this purpose its government should be in the hands of a board of trustees who could be removed only by impeachment and trial before the Supreme Court of the United States. Thirty members of this board should be selected and nominated by the President, and confirmed by the Senate, and then ratified by the Supreme Court of the United States. The remaining members of the board of trustees should be, *ex officio*, the president of the United States, the vice-president, the speaker of the House, the chief justice of the Supreme Court, the commissioner of patents, the secretary of the Smithsonian Institute, the commissioner of education, the librarian of Congress, and possibly one or two oth-

ers. The term of office of the *ex officio* members should be during the term in which they hold their official positions respectively. The thirty members, in the first instance, should be elected for the following terms: Three for one year, three for two years, three for three years, and so on; the last holding office for ten years. Afterwards, every member is elected for ten years. This method would cause the election of three members every year. Members are eligible for re-election. The board fills all vacancies. It might be desirable for the president of the university to be a member of the board of trustees. It might perhaps, add to the strength of the management if the presidents of ten of our leading colleges or universities should be *ex officio* members of this board. This would make sure of an element of high scholarship and practical acquaintance with the best college work of the country and would keep these leading institutions in close touch and sympathy with the university. It should be the duty of the board of trustees to shape the policy of the university, to inaugurate or sanction new methods, new departures, new movements, appoint the president and faculty, and to have the general oversight which is usually invested in such a board. The design of this plan of organization is to free the university from political influence, disconnect it from any and every department of the government, and permit its management to be untrammeled, wise and efficient. It would be proper for this board, when the university has come into successful operation, to devise methods by which the faculty of the different schools or departments of the university may propose to the trustees plans for their consideration and approval, or rejection.

V. ITS MEMBERS.

The next two topics are the most difficult to deal with. How the members and fellows of this university should be selected, and what should be the terms of admission, are questions which lie at the bottom of success for the institution. I venture to suggest in a tentative way some such plan as the following, as well calculated to secure the broadest and most generous patronage and the highest quality of talent possible: In the first place, let students be appointed to membership from the different congressional districts in the country by competitive preliminary examinations. In this way every member of the House of Representatives will have an opportunity to present to the people of his district the

chance of selecting from their scholarly young men one to be a candidate for admission to the university through its regular examination. In the next place, I would propose that every college in the country of good reputation for high scholarship, and which has the power to grant degrees, should have an opportunity to send one candidate for admission. But it must be distinctly borne in mind, that no one can be admitted a member of the university except by passing in a creditable manner a rigid examination, such as shall be laid down by the trustees, or the faculty acting under the direction of the trustees.

No tuition shall be charged for such students as have now been indicated; but, on the other hand, as the entire aim and design of the university is to benefit the country, and hence the work of the students is to be in a certain sense for the public welfare, it will probably be deemed wise and just to allow to each student thus recommended by the members of Congress or by the faculty of the colleges, a fixed sum annually, sufficient, with the strictest economy, to defray his necessary expenses,— perhaps five hundred dollars a year. Still another class of students may be admitted on their own application, each one passing, of course, the requisite examination. This class, however, will be expected to pay a reasonable tuition and will not receive pay from the university. The students thus selected will pursue the regular courses of study, some in one direction, some in another, not merely by election, but by the most careful consultation between the student and the faculty. It is to be understood that no student is to be admitted to this university except such as have completed successfully courses of study equivalent to what is required in our best colleges for the master's degree, but graduation from a college or any other educational institution is not essential for admission. Qualifications for admission are to be determined only by the regular examinations.

VI. FELLOWSHIPS.

Under this department the most important work of the university is to be done. There should be a class termed "Fellows of the University," who have taken the regular courses of study in this institution in some one direction, — or by exception, without having thus taken them, — for example, the line of sciences, or of classical study, or the metaphysics, or economics, etc. Every Fellow of the university is to be selected and approved by the faculty

and appointed by special vote of the trustees to carry on some line of broad study. These Fellows shall pursue studies in classes or groups, or singly as the case may require, under the direction of that branch of the faculty having charge of the particular line of study pursued. The object of this work shall be to add something original to the sum total of human learning and knowledge. Their studies may be continued so long as the faculty in charge shall deem it advisable, whether for one year or a lifetime.

Let me outline some of the possibilities of the work which might be done by the faculty and Fellows of this university. The department of geological survey should be established on such a basis that this whole country should be mapped out and its geological features and mineralogical riches should be carefully studied and published for the benefit of the country. The weather bureau should be organized in such a way as in a series of years to collect facts sufficient to form the data for a complete and scientific theory of tempests, tornadoes, and storms of all kinds. The entire theory of evaporation and the rainfall, of the winds, as to their direction and force, and all matters relating to the meteorology of the country should be elaborated and made plain. The coast survey should be reorganized and its work continued. Expeditions should be planned and executed for the study of ocean currents and tidal waves, and in fact of the entire theory and practical operation and effects of the tides. The most elaborate preparations should be made for the observation of eclipses and other astronomical phenomena. In cases of disaster, for example, the breaking down of a railroad bridge, the destruction in the Conemaugh Valley, a great fire, an epidemic, a blizzard or a tornado, an expedition should be immediately sent to the spot for careful investigation into the causes, circumstances, and results, and all this should be tabulated for future use. In short, the object constantly in mind for the work of the Fellows of the university would be to take advantage of all remarkable phenomena and so applying the full power of the microscope of all science as to educe in every instance such knowledge as shall be for the benefit of mankind. Among these Fellows we should expect to find our poet laureate, our best writers of fiction, philosophers, inventors, discoverers, benefactors. Fellows of the university should receive a fixed salary according to their grade and experience, a salary sufficient to induce them to remain permanently at their work. In

this way we should have clustering around the national university the ablest men, the highest scholarship, the soundest philosophy, the deepest science of the world, and who can measure or weigh, or estimate the advantages which would accrue to society and the world at large from such concentration of scholarship and learning.

The United States should be not only the greatest and strongest of the nations, but she should be the wisest and most beneficent. She has laid a broad foundation for a pyramid (which should be larger and more enduring than those of Egypt), in the general diffusion of the elements of learning for all her youth in our beneficent system of public schools. Let her now, by the establishment of this national university build securely and strongly upon this basis and extend upward this great pyramid till its apex shall be high up in the heavens, above all mists of ignorance, superstition, vice and crime.

USELESS QUESTIONINGS.

BY JULIA H. MAY.

A little girl looked on the starry sky
And wondering said, "Please teacher, just explain
How they do move." The Master knew 't was vain
To talk of Newton's laws, but answered, "I
Will tell you, when you're older, how and why.
The stars are there. They move. Look. Look again.
But do not try to tax your little brain
With puzzles now." And thus sometimes we try
To question our great Teacher. "Not yet grown,"
He answers. "Heaven's maturity shall this
Reveal. Unknown shall then be fully known,
Not now; for mystery of the immortal is
Discerned by immortality alone.
Why not these foolish questionings dismiss?"

EDUCATION IN THE STATE CONSTITUTIONS.

BY B. A. HINSDALE, PH. D., UNIVERSITY OF MICHIGAN.

I.

THE provisions of the State Constitutions concerning schools and education from the year 1776 to the present time, brought together in chronological order and accompanied by a suitable historical commentary, would form at once an interesting chapter in the history of American Jurisprudence and in the history of American Education. So much, it is believed, the present essay will make plain. It seems necessary, however, in one case to go back of the State Constitutions.

The charter given to William Penn by Charles II. in 1681, authorized him, as the proprietor of the province conveyed, subject to the Crown, to make all laws necessary for its government, with the approbation of the freemen, or the greater part of them, or their delegates or deputies assembled; said laws to be not repugnant, but agreeable to the laws of England. Clothed with this ample power, animated by liberal sentiments, and desirous of making his colony attractive to settlers, Penn issued from time to time "Frames of Government of Pennsylvania" that really served the purposes of charters or constitutions. The "Frame" that bears the date of April 25, 1682, said to have been written in England, contained the following, which is the first provision of the kind in any similar American document: —

> "That the Governor and provincial Council shall erect and order all public schools, and encourage and reward the authors of useful sciences and laudable inventions in the said province."

This provision, reaffirmed in the "Frame" of 1683, was "heard, read, and thankfully received" by the members of the provincial Council and Assembly. We are not here further concerned with this provision except to say, it was the work of William Penn, and not of the Colony of Pennsylvania.

But this is not the sole educational distinction that Pennsylvania enjoys. She has also the honor of being the first state to incorporate an educational provision in her constitution. Before

the declaration of independence, when the colonial governments were gradually slipping from the old foundations, owing to the practical denial of the king's sovereignty and authority, some of the colonies asked the advice of the Continental Congress concerning the anomalous state of affairs. The Congress responded in December, 1775, and again more fully in May, 1776, the second time recommending to the assemblies and conventions of the colonies where the existing governments were not sufficient to the exigency of their affairs, "to adopt such government as shall, in the opinion of the representatives of the people, best conduce to the happiness and safety of their constituents in particular, and America in general." In pursuance of this recommendation, which was plainly necessitated by the logic of events, all the states but Connecticut and Rhode Island, which considered their Colonial Charters sufficient for present exigencies, proceeded to frame State Constitutions; some of them very rudimentary and imperfect, others well thought out and elaborated, but all of them legal instruments of a kind before unknown. The Pennsylvania Constitution, completed September 28, 1776, had this provision: —

"A school or schools shall be established in each county by the legislature, for the convenient instruction of youth, with such salaries to the masters, paid by the public, as may enable them to instruct youth at low prices, and all useful learning shall be duly encouraged and promoted in one or more universities."

The Pennsylvania Constitution of 1790 went still further, declaring: —

"The legislature shall, as soon as conveniently may be, provide by law for the establishment of schools throughout the state, in such manner that the poor may be taught gratis.

"The arts and sciences shall be promoted in one or more seminaries of learning."

These sections were reaffirmed in 1838, and they continued the fundamental school law of the state down to 1873.

Education next appears in a constitution where few would look for it. North Carolina provided in 1776: —

"That a school or schools shall be established by the legislature, for the convenient instruction of youth, with such salaries to the masters, paid by the public, as may enable them to instruct at low prices; and all useful learning shall be duly encouraged, and promoted in one or more universities."

One of the sections of the so-called Vermont Constitution of 1777, which the people appear to have considered as law, ran as follows: —

"A school or schools shall be established in each town, by the legislature, for the convenient instruction of youth, with such salaries to the masters, paid by each town, making proper use of school lands in each town, thereby to enable them to instruct youth at low prices. One grammar school in each county, and one university in this state, ought to be established by the General Assembly."

The first population of Vermont came from the older New England states; but this section bears an unmistakable resemblance to the Pennsylvania section of 1776. This is the earliest reference to "school lands" found in any of our constitutions. Vermont had a second constitution before she was admitted to the Union. This one, which bears the date of 1786, provides that "a competent number of schools ought to be maintained in each town for the convenient instruction of youth; and one or more grammar schools be incorporated, and properly supported in each county in this state." Incorporated societies for the advancement of learning should also be encouraged and protected. The constitution of 1793 simply repeated these provisions, and they are in force today.

Massachusetts was the first of the colonies to found a system of public schools. No reference to schools or education, however, is found in any of her several charters, save the provision in the charter of 1691, that all lands, tenements, hereditaments, and other estates, held or enjoyed, or that ought to be held or enjoyed, by any college should in no wise be affected by said charter, but should remain inviolate. No doubt this guaranty was given in the interest of Harvard College. Increase Mather, who was so active in procuring the charter, was at the time president of Harvard. The constitution of 1780 contained a chapter entitled "The University at Cambridge, and encouragement of literature, etc." The first section, consisting of three articles, threw the strongest safeguards around the college; the second section was in these words: —

"Wisdom and knowledge, as well as virtue, diffused generally among the body of the people, being necessary for the preservation of their rights and liberties, and as these depend on spreading the opportunities and advantages of education in the various parts of the country, and among the different orders of the people, it shall be the duty of the legislatures and magistrates, in all future periods of this Commonwealth, to cherish the interest of literature and the sciences and all seminaries of them, especially the university at Cambridge, public schools, and grammar schools in the towns; to encourage private societies and public institutions, by rewards and immunities for the promotion of agriculture, arts, sciences, commerce, trades, manufactures, and a natural his-

tory of the country; to countenance and inculcate the principles of humanity and general benevolence, public and private, charity, industry, and frugality, honesty and punctuality in all their dealings; sincerity, good humor, and all social affections and generous sentiments among the people."

This section was drawn by John Adams, who, in 1809, gave a circumstantial account of the influences that led to its introduction. His interest in the subject of natural history dated, he said, from his visits to a collection of American birds and insects at Norwalk, Connecticut, in 1774, '5, '6, '7, on his journeys to and from Philadelphia. He appears to have been interested more in the progress of science than in the progress of learning. He says his "mind and heart were so full of the subject" that he inserted the section in the draft of constitution laid before the convention, adding: "I was somewhat apprehensive that criticism and objection would be made to the section, and particularly that the 'natural history' and the 'good humor' would be stricken out, but the whole was received very kindly, and passed the convention unanimously without amendment."[1] The constitution of 1780 has been many times amended, but the sections of the educational chapter have never been set aside or modified. An amendment was adopted in 1857, declaring that no person should have the right to vote, or be eligible to office in the state, who could not read the constitution in the English language, and write his name, unless he was physically disqualified to comply with the requirement, or was at least sixty years old, and a voter, at the time that the amendment took effect.

New Hampshire was the very first of the states to attempt constitution-making. On Jan. 5, 1776, a "Civil Government" was completed. This constitution was exceedingly brief, and contained no reference to education. In 1784 a fully developed constitution went into operation, which copied, with some verbal changes, the second Massachusetts section of four years before. The "natural history of the country" was retained, but, for some reason unexplained, the "good humor" made room for "sobriety." The constitution of 1792, which, with various amendments, is still in force, follows the section of 1784, word for word.

The Georgia constitutions down to 1798 are silent on education. But the constitution of that year has this sentence: —

"The arts and sciences shall be promoted in one or more seminaries of learning; and the legislature shall, as soon as conveniently may be, give such fur-

[1] Works of John Adams, IV., pp. 259-261.

ther donations and privileges to those already established as may be necessary to secure the objects of their institution; and it shall be the duty of the general assembly at their next session, to provide effectual measures for the improvement and permanent security of the funds and endowments of such institutions."

The foregoing are all the educational provisions found in the constitutions of the Revolutionary period. The constitutions of New Jersey, Maryland, Delaware, Virginia, and South Carolina, all of 1776, and of New York, 1777, together with all their revisions for many years thereafter, said not a word on this subject, since considered so vital. In the case of Pennsylvania and the New England states, it is easy to name the main influences that secured the adoption of these excellent provisions. In Pennsylvania, they were the Quakers and Doctor Franklin; in New England, Puritanism. Pennsylvania was deeply indebted to a second son of New England. Had it not been for Timothy Pickering, then residing in the Wyoming district, and representing Luzerne County in the constitutional convention of 1789, the educational section, instead of being widened, would have been narrowed.[1] To explain the North Carolina and Georgia provisions is more difficult, and will not be attempted. The failure of the other southern states to act was due, of course, to that indifference to popular education so characteristic of those states until recent years. Sir William Berkeley in 1661 prayed better than he knew. Notwithstanding Jefferson's efforts in behalf of education, extending from 1779 to the end of his life, the Old Dominion never had public schools worthy of the name until after the Civil War. In New York, educational interest was greater than in the South generally, but much less than in New England. New Jersey took no step in the direction of establishing public schools for many years after the Revolution; which is the more remarkable since she had a large New England population. On the whole, the fact that five states provided for schools in their constitutions in the midst of the confusion, poverty, and distress of the war for independence — the first constitutions, too, that were ever framed — is a striking proof of the hold that education had of the minds of the people. Besides, the number of these states would have been increased by two if Connecticut and Rhode Island had then thought it necessary or advisable to revise their fundamental laws.

The next constitutions in order are those of Kentucky, admit-

[1] Wickersham: History of Education in Pennsylvania, p. 258.

ted to the Union in 1792, and Tennessee, admitted in 1796. Neither one made the slightest allusion to schools or education. Kentucky was the child of Virginia, Tennessee of North Carolina, and yet the first had a considerable Carolina, the second a considerable Virginia population.

Now we come to a series of transactions that constitute an important chapter in the legal as well as in the educational history of the country.

The ordinance of May 20, 1785, for ascertaining the mode of disposing of such lands as particular states had ceded to the United States, and the Indian tribes had relinquished, contained the outline of the later national system of land surveys, and also the germ of the public-land educational policy afterwards fully developed. "There shall be reserved the lot No. 16 of every township for the maintenance of public schools within the said township." The powers to the Board of Treasury, July 23, 1787, authorizing the sale of the Ohio Purchase to the Ohio Associates confirmed this resolution so far as this purchase was concerned; and the Ordinance for the Government of the Territory Northwest of the River Ohio, of the same year, contained the well-known words: "Religion, morality, and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged." Here matters rested for fifteen years. The Enabling Act for Ohio, approved April 30, 1802, made certain conditional propositions to the Constitutional Convention that it provided for, the main one being: "That the Section No. 16 in every township, and when such section has been sold, granted, or disposed of, other lands equivalent thereto and most contiguous to the same, shall be granted to the inhabitants of such townships for the use of schools." These conditions the convention promptly met, and so the reservation of 1785 became conclusive upon Congress. But this action left several interesting questions unsettled. They were these: Shall these lands be leased or sold? and if sold, shall the proceeds be used up at once, or shall they become a perpetual public-school endowment? Moreover, who shall manage the lands, and constitute and manage the schools, the nation, or the state? Congress, or the Legislature? Nothing so far had been concluded on these points. It is obvious that several lines of policy were open to Congress, one of them being the creation of a system of national schools co-extensive with

the public-land states. Congress answered all of these questions but one, so far as Ohio was concerned, in an act approved March 3, 1803, which vested all lands granted to the state for the use of schools in the state legislature, "in trust for the use aforesaid, and for no other use, interest, or purpose whatever." This left the state to say whether the lands should be leased or sold, and the proceeds be capitalized as a permanent fund. At first, the leasing plan was tried, but, proving very unsatisfactory, was finally abandoned. In pursuance of the contracts made with the Ohio Associates and with Symmes, who purchased the lands lying between the Great and the Little Miami rivers, in 1787, Congress also gave to the State of Ohio three townships of land for the establishment of two universities.

These donations to Ohio were the first of the two series of land endowments for public schools and higher institutions of learning that extend to all the states hitherto formed out of the national domain, and prospectively to states yet to be formed. While these endowments form a very important chapter in the history of American education, there would still be no reason for referring to them here were it not that they have an important bearing on the subject immediately in hand.

Ohio was the first of the public-land states, and these are the educational sections, vague and general it will be seen, that she set in her first constitution: —

"... Religion, morality, and knowledge being essentially necessary to good government and the happiness of mankind, schools and the means of instruction shall forever be encouraged by legislative provision, not inconsistent with the rights of conscience."

"That no law shall be passed to prevent the poor in the several counties and townships within this state from an equal participation in the schools, academies and universities within this state, which are endowed, in whole or in part, from the revenues arising from donations made by the United States for the support of schools and colleges; and the doors of the said schools, academies, and universities shall be open for the reception of scholars, students, and teachers of every grade, without any distinction or preference whatever, contrary to the intent for which the said donations were made."

The next state to enter the Union was Louisiana, in 1812. So feeble was her educational interest that, although she had been endowed with more than three-quarters of a million of acres of school lands, she did not mention schools or education in her constitution.

Indiana, entering the Union in 1816, incorporated into her con-

stitution the most definite school provisions yet found in any state constitution. Starting out with a paraphrase of the education article of the ordinance of 1787, Section 1, Article V. throws around the school lands the necessary safeguards, and makes it the duty of the legislature "to encourage intellectual, scientifical, and agricultural improvements by allowing rewards and immunities," etc. Section 2 is in these words: —

"It shall be the duty of the general assembly, as soon as circumstances will permit, to provide by law for a general system of education, ascending in a regular gradation from township schools to a state university, wherein tuition shall be gratis, and equally open to all."

This section marks a step in the advance. Previous to Indiana, no state had, *in its constitution*, declared for a graduated system of schools extending from the district school to the university, equally open to all on the basis of gratuitous instruction. Section 5 of the article provided for a public library in every county in the state.

Except Article VI. of compacts, the principles of the Ordinance of 1787 were extended to the Territory Southwest of the river Ohio, out of which the states of Mississippi and Alabama were made. Mississippi, in 1817, said that schools and the means of education should forever be encouraged; and directed the legislature to take measures to prevent the school lands being wasted or damaged, but to apply the funds that might arise from their rental in conformity with the object of the grant, declaring that the lands should never be sold by authority of the state. Except the prohibition of sale, these provisions were repeated by Alabama in 1819. The explanation of these slender educational provisions in the two states is furnished by the origin and character of their population, most of which came from the old southern states, and by the continual blighting effect of slavery. The first of these causes also explains the omission of educational sections from two constitutions where some, at least, would have expected to find them.

The Enabling Act for Illinois, April 18, 1818, made the usual conditional offer of school lands to that state. The Constitutional Convention promptly met these conditions in an ordinance that accompanied the constitution, but not one word more did the convention utter on the subject. Nor were schools mentioned in the constitution of 1848. It was not until 1870 that common schools or education of any kind obtained constitutional recognition. The

southern part of Illinois had a considerable population at a time when the northern part was still unoccupied and waste. Moreover, this early population came mainly from Virginia, the Carolinas, Kentucky, and Tennessee. For a long time the state's political, intellectual, and commercial connections were with the South, by the way of the Mississippi and its branches, rather than with the North and East by the way of the Great Lakes. It was the representatives of this southern-born population that framed the constitution of 1818. Despite the prohibition of slavery in the Northwest Territory enacted by Congress in 1787, the same constitution permitted slavery in a modified form; the state was convulsed in 1822–1824 with an attempt to call a new constitutional convention for no other purpose than to establish slavery on the same footing as in Kentucky and Missouri, in which attempt many northern men, by the way, participated: while the census-takers actually reported slaves in the state as late as 1840. As a partial balance of northern and southern population and connections had been established by 1848, the omission of schools from the constitution of that year creates more surprise than the omission of 1818. The census maps show that while the lower half of the state was then wholly occupied, considerable districts in the upper half were still uninhabited. Even as late as 1850 the southern-born population was sixteen per cent. of the whole. But as Indiana, at that time, had relatively a still larger southern-born population, this explanation is not fully adequate. The fact is that, for some reason, Indiana was less under Southern influence than Illinois.

The Illinois provisions of 1870 are few and simple, considering the tendencies of the last forty years. The general assembly shall "provide a thorough, efficient system of free schools, whereby all the children of this state may receive a good common school education." The school and university funds are well guarded.

Missouri, in 1820, provided for the preservation of the school and university lands, and for the application of the funds arising therefrom to their proper objects. She said one or more schools should be "established in each township as soon as practicable and necessary, where the poor shall be taught gratis." In due time the university should be organized. These modest provisions were according to the measure of the time; much more ample ones were inserted in the constitutions of 1865 and 1875.

Maine, also coming into the Union in 1820, made it the consti-

tutional duty of the legislature "to require the several towns to make suitable provision at their own expense, for the support and maintenance of public schools," and its further duty "to encourage and suitably endow, from time to time, as the circumstances of the people may authorize, all academies, colleges, and seminaries of learning within the state." Beyond this limit the fundamental law of the state has never gone.

THE SCHOOL SYSTEM OF MICHIGAN.

BY MRS. C. H. STANLEY,

Principal Training School, Kalamazoo, Mich.

MICHIGAN was admitted to the Union in 1837. Peopled with New Englanders and New Yorkers, whose fathers were New Englanders, it is not strange that the attention of the new state was early turned to education. Interest in the subject came, like original sin, by "ordinary generation."

Accordingly, one of the first appointments under the state government was a Superintendent of Public Instruction, the first office of the kind ever filled in the United States. The new superintendent was Rev. John D. Pierce, a Congregational minister, then engaged in missionary work among the pioneers of central Michigan. Fortunately he was a man of sound culture, broad views, and good judgment, for to him was committed the work of preparing a system for common schools and a plan for a university with its branches. He had studied carefully the school system of Prussia, and in mapping out a plan for Michigan he availed himself of whatever good things he could find anywhere. The plan drawn up by him and adopted by the legislature contained most of the essential features of the present school system.

A glimpse of the schools of that long ago time may be of interest in showing from what small beginnings we have grown. The schoolhouse of the pioneers was generally placed at the intersection of roads, where there were any, or on the brow of some hill. It was built of logs, sometimes roughly hewed, and chinked with stones and mortar made from the ground near by. The door was made of rough boards hung on wooden hinges and fastened

with a wooden latch. In wealthy communities where glass could be obtained, three or four logs were cut through and sash put in. In many places, however, glass was an unattainable luxury, and a square cut out of one log and covered with oiled paper had to do duty as a window. No stoves were used, but an ample fireplace was made at one end of the room with a chimney built of sticks and mud. Wood was plentiful, and a rousing fire atoned for the want of many other comforts. For seats, slabs mounted on legs were used, and there our mothers dangled their little feet while waiting to say their "A B C's."

The branches taught in those early days were reading, spelling, writing, and arithmetic. Reading and spelling were specialties, and were regarded as the chief tests of scholarship. Neither gold nor steel pens were used, but all writing was done with pens made of quills. One of the chief requisites in a teacher's qualifications consisted in his ability to make and mend pens.

Such was the condition of education throughout the rural districts of Michigan when "Father Pierce," as he is reverently called, took the helm. Under his careful guidance, laws were devised and plans perfected for an educational system which has been a permanent blessing to the people of the state. It was the wish of the founders of our school system to place a common school education within reach of every child in the state, and to provide higher instruction for all who could or would avail themselves of it.

Let us see whether our system in its various branches does this.

First in importance, since it is for all, is our common school. Every county is divided into townships; every township into school districts. Each *school district* has its board of three members, a moderator, a director, and an assessor. The duties of the board are to build schoolhouses, employ teachers, decide for what length of time the school shall be taught, etc. Each *township* has a board of three inspectors, whose main duty is to regulate the boundaries of school districts and to visit schools. It is said by the country teachers that the latter branch of the school inspectors' work is not a very great tax upon their time. *Each county* has a board of school examiners consisting of two members elected by the chairman of the township boards of inspectors, and a secretary, who is *ex officio* a member, elected by these two, acting with the county Judge of Probate. The secretary

of the county board visits, or causes his assistants to visit each school in the county at least once a year, counsels with teachers and school boards as to the courses of study and discipline; makes suggestions with regard to school buildings and grounds, heating, ventilation, etc., promotes the improvement of schools, and the elevation of the character and qualifications of teachers and officers; and receives the reports of the township inspectors. The compensation of the secretary is from $300 to $1500 per annum, according to the number of districts in the county. In addition to the foregoing duties, the secretary holds two regular, and not more than six special, examinations annually. Certificates granted are of three grades and are good for one, two, and three years respectively. Second and third grade certificates can be used only in the county in which they are granted, while those of the first grade have been made valid throughout the state.

These county examinations bring to light things rich and racy, if the examiners are to be believed, and do not tend to make us vainglorious in our estimate of Michigan intellectuality.

One locates the national government at Lansing and makes the governor the chief executive of the nation — a truly loyal view of the subject, but, considering the breadth of the land, a trifle narrow.

Another gives as a definition of "manual labor" — "labor performed by a man," which possibly housekeepers, in the cleaning season, might resent.

One says, "The cause of the change of seasons is, the earth works up towards the north pole in the summer, and the earth works down towards the south pole in the winter."

Another, that "the tropics slide north and south on the equator." What effect is produced by this is not stated — probably the late earthquakes.

The answers are equally lucid in physiology. One says that "vocal sounds are made by slight variations of the waist." Another that "the diaphragm is the outside skin of the livvur," while still another tells us that "the blud contains oxogen, hydrogen, parafeen, and atoms." This probably accounts for the prevalence of blood poisoning in these latter days.

A disappointed applicant, writing an indignant letter of remonstrance to the examiner who had refused to pass her in grammar,

says that *none of her friends* can find any mistake in her paper, and intimates strongly that if it had been a fellow townswoman of the examiner's he "would not have *did* it."

Without doubt some of Caroline Le Row's children have straggled out West and applied for certificates in Michigan!

Lest I should seem to be ridiculing my own fellow-workers, let me hasten to say that I have been told by one of the examiners of this (Kalamazoo) county, that only about one-third of the applicants succeed in obtaining certificates of even the lowest grade. We will hope that those referred to were among the unsuccessful.

County examinations do not guarantee successful teachers. They only serve to keep out a part of the horde who think that "anybody can teach."

Under the county and township superintendency each examiner could ask such questions as he chose, and the questions varied as much as did the intellectual attainments of the men who asked them. It was thought best to make the questions uniform as a means of raising the standard. Accordingly the State Board of Education in 1880, sent out questions to be used at the regular spring and fall examinations throughout the state. The plan was approved and is still in use.

The State Board of Education consists of the Superintendent of Public Instruction and three other members elected for a term of six years. This board has entire control of the State Normal School, grants state certificates good for ten years anywhere in the state, and prepares questions to be used by the county boards.

The State Superintendent of Public Instruction has general supervision of the public schools and of state educational institutions, collects and tabulates the school statistics, and makes an annual report to the governor. He organizes and visits teachers' institutes and appoints instructors for them, delivers lectures on educational subjects, etc., etc., and receives a salary of $1000 per year — about one-third as much as Detroit pays her base ball pitcher. But after all, considering the relative interest felt in the two subjects by the voters of Michigan, as shown by the attendance at a school meeting and a ball game, and the relative space devoted to each by the press of the state, the difference in salaries is not strange. Amusements we must have; education — if there is enough left to pay for it.

In the matter of salaries, Michigan is neither at the head nor the foot. The average salary paid to women in the public schools is $31.18 per month. Nevada pays $96, Maine, $15. Many of the district school teachers are paid far below the average; there are those who teach for two dollars and a half a week and "board around." What is likely to be the quality of services secured at that price I leave you to judge. In many districts the custom still obtains of letting the school to the lowest bidder. The connection between such policy and the results of the county examinations as given above can be readily seen.

Between the district school and the university come the graded and high schools.

In 1874 the citizens of Kalamazoo brought a case before the circuit court in order to test the right of a school board to establish and maintain a high school as a part of the public school system of the state. The court ruled that though there was nothing in the school law expressly directing the establishment of such schools, there was nothing, on the other hand, forbidding it. This decision has been regarded as final, not only for the state of Michigan but for other states in which the school law is so worded as to leave any doubt on this point.

There is an arrangement by which high schools in Michigan desiring recognition from the university are visited and examined by a committee of the faculty, and if approved, have their graduates admitted to the university without further examination. This seems to supply the last link needed to connect the lowest and the highest departments of our school system.

UNIVERSITY OF MICHIGAN.

The University of Michigan was established by legislative act, March 18, 1837, and celebrated its semi-centennial in July, 1887. It has been fitly called "the crown of Michigan's school system." The university comprises, in addition to the literary department, the professional departments of law, medicine, pharmacy, dentistry, civil engineering, electrical engineering, and pedagogics. The reputation of the school is national. It numbered in 1888, 1677 students (among them representatives from almost every state in the Union and many from foreign lands), and ninety-three professors and instructors. The university doors were first opened to women in 1870.

STATE NORMAL SCHOOL.

A state that would have its educational system keep pace with the times must provide some means for the professional training of its teachers. Accordingly, the legislature of 1849 passed an act providing for the establishment of a state normal school. Ypsilanti was selected as a suitable place for its location, and the school was opened in 1852. The object of the school is to give professional training and practice in teaching. Opportunities for practice are afforded by a model school connected with the institution. The Normal School has an attendance of over nine hundred students. It sends out a graduating class of about one hundred annually, and yet fails to meet the demand for trained teachers.

STATE AGRICULTURAL COLLEGE.

Michigan is largely an agricultural state. To meet the wants of a numerous class, the Agricultural College was established, by act of the legislature, and was opened in 1857 at Lansing. The objects which this institution is designed to accomplish are worthy of notice.

They are: —

1. To impart a knowledge of science, particularly those sciences which relate to agriculture and kindred arts, such as chemistry, botany, zoölogy, and animal physiology. Within a few years veterinary surgery has become an important branch of study.

2. To afford to students the benefits of daily manual labor. It is held that four years of study without labor during the time when habits and tastes are forming, will almost inevitably produce disinclination, if not inabilty to perform the work and duties of the farm.

3. To prosecute experiments for the promotion of agriculture and horticulture.

4. To afford the means of a general education to the farming class.

The course includes instruction in surveying, laying out of grounds, building, stock-breeding, agricultural chemistry, horticulture, etc. The school is in session during the entire summer, the long vacation being in the winter.

MICHIGAN MINING SCHOOL.

Michigan is not only an agricultural but a mining state as well.

The wheat fields and fruit farms of the southern peninsula are offset by the copper mines of the Lake Superior region. A wise system of schools could not ignore this source of wealth or fail to provide for its scientific development.

The Michigan Mining School, established in 1885, is located at Houghton in the upper peninsula. The course of instruction is such as to "conduce to the end of enabling the students of said institution to obtain a full knowledge of the science, art, and practice of mining, and the application of machinery thereto," and is largely of a practical as well as of a scientific nature. The school began its first session in September, 1886. It has at present five instructors and thirty-five students.

INSTITUTION FOR THE DEAF AND DUMB.

Thus does Michigan provide instruction for all her children, who are able to receive it. But through the length and breadth of the land there are dumb lips pleading for that which alone can bring them into communion with their fellows; there are sightless eyes striving to pierce the veil which darkens their lives. A true mother will not be neglectful of her helpless children, and Michigan is no step-mother.

The Institution for the Deaf and Dumb at Flint provides education for this unfortunate class, and gives them an apprenticeship in certain trades with a view to making them self-supporting upon leaving the school. The trades taught are cabinet-making, shoe-making, willow work, printing, and, for the girls, sewing and knitting.

SCHOOL FOR THE BLIND.

The School for the Blind, at Lansing, is similar in scope and design to the Institution for the Deaf and Dumb. It proposes to give pupils the benefit of an education, and to fit them for becoming self-sustaining. Much attention is paid to music, both vocal and instrumental. Aside from the enjoyment which music affords, it becomes to many a source of self-support. As organists in churches, as teachers, and as piano-tuners many of the blind earn a competent livelihood. Every pupil has the privilege of studying music. After a thorough trial, the lessons are discontinued if a correct taste is not developed. The trade of broom-making is at present the only one taught in the school. All the boys are required to work a part of each day unless excused.

STATE REFORM SCHOOLS.

Early in the history of the state it became apparent that some provision must be made for youthful criminals. To send young boys convicted of some petty theft or misdemeanor to the state prison, to be the companions of hardened men, was to confirm them in a life of crime. To take them from their evil associations and place them in an institution where they would be obliged to attend school and do a certain amount of work, where they were taught obedience to law and order, and trained in habits of industry was, in many cases, to save them. Such are the objects of the State Reform School at Lansing. A similar school for girls was a few years ago established at Adrian, and many a wretched girl has been kept from a life of shame by having thus forcibly put into her hands the means of honest self-support.

STATE SCHOOL FOR DEPENDENT CHILDREN.

In 1870 a commission appointed by the governor for this purpose, visited many of the poor-houses of the state and found a large number of children in them indiscriminately associated with idiots, maniacs, prostitutes, and vagrants. Their report recommended that such children under sixteen should be placed in a state school. The State School for Dependent Children at Coldwater was the outcome of their work.

This is not a reformatory institution, as many suppose, but is a home and school for those who have been, or would otherwise be, inmates of poor-houses, for those who have been deserted by their parents or whose parents have been convicted of crime, and for orphans.

Here they are kept, taught the common English branches, and, as far as their age will permit, how to work; the boys to do gardening, farming, making shoes and clothing, the girls to do housework and sewing. As soon as possible homes are provided for them by agents in each county appointed by the governor. Children are received between the ages of four and sixteen. Cottages having a capacity of about thirty each are provided, and each building is in charge of a cottage-manager.

It is a noble charity and, strange to say, is the first of the kind in the world.

This, in brief, is the school system of Michigan. In the words

of ex-Superintendent Nelson, "To assert that our schools have the singular merit of being the best in the world, is too flagrant self-conviction, either of disingenuousness or of ignorance. Happily for the other states of the Union, happily, also, for our own benevolent wishes for our countrymen and for mankind, we have no legitimate reasons for making any such claim. It is enough to know that our common schools and schools of higher learning have taken rank with the best in the world: that, for example, our great university has a reputation and influence far out-reaching the most casual and imperfect knowledge that the *state* of Michigan as much as exists. Hence we have a right to feel that our lines have fallen in pleasant places, that our lot is cast in an enlightened age and in a progressive and prosperous commonwealth.

THE TEACHING OF SCIENCE.[1]

II.

SCIENCE IN SECONDARY SCHOOLS.

BY E. A. H. ALLEN.

FOR convincing reasons, not now necessary to state, the sciences have been brought into our school curriculums, and, in spite of the foolish and unsatisfactory ways in which they have often been presented, have come to stay. Let us see, then, how they may best fulfill their truer end in education.

We notice, first, the two-fold division of science, into Natural History and Physical Science, or the Sciences of Matter and of Force, — a real distinction, though their interpenetation is everywhere seen and constantly made use of in teaching.

A plan for rudimentary instruction in science, for the lower schools, will train the child's power of observation through *material things*, parts of the human body, plants, minerals, and the phenomena they exhibit. A plan for scientific instruction in College or Technical Institute, investigates the *forces* which these phenomena involve. It may also follow out some specialty, — electricity, astronomy, physiology, — or even some division of these, as elec-

[1] Copyright, 1889, by Eastern Educational Bureau.

tric lighting, the relation of meteors to comets, or of food to climate.

Between these two divisions lies the field of the present inquiry, — a plan of scientific training best suited to the needs of our secondary schools.

A satisfactory plan implies the earlier course in the lower schools mentioned above, — a preparation now seldom given. It is also preparatory for a higher course; but in a true sense it must be complete in itself, and not arranged especially for the needs of the very few whose education is to extend beyond the high school. Its methods must be practicable in *all* secondary schools, high schools, and academies, not only where means and facilities of illustration are cheerfully and abundantly supplied, but where such support is limited, and where the teacher must rely mainly on his own resources.

What faculties are to be educated and what should form the subject-matter of such a course?

In the study of Natural History there is to be constant training of the senses. Of the eye especially; and with this frequently ends the instruction given. But each of the senses requires as careful, if not as extended, training. The experienced ear, either alone or with the help of reflectors, stethoscopes, etc., will tell the direction and distance of sounds, as well as their source, the shape and size of a room, and the material, structure, and condition of bodies. The delicacy of the sense of touch in the blind can in some degree be acquired by all for "sightless men can tell unnumbered things which vision cannot find"; its usefulness in the study of minerals, powders, and fabrics, being obvious. And in many occupations of after life, as well as in the study of plants, minerals, and manufactured articles, taste and smell are so important as well to receive systematic attention.

The chief characteristic of good perception is accuracy, — a quality secured by some pupils with great difficulty. Quickness is desirable; but patience, rarer still, is indispensable to the best success. And it is a great advantage the sciences have over the languages that with the former are so many various points to which observation must be directed, — to form, size, color, surface, density, odor, taste, — while in the latter we can observe only the structure of words and of sentences.[1] Though these things be-

[1] This is not said in disparagement of the study of language. "For the things which we call *words* are *organic* things, like animals and vegetables. They have roots and

long to the education of a young child, they are mentioned here because at present our primary and grammar schools are only beginning — take the country through — to do this important work, and if done at all it must come in a subsequent course.

Other faculties, however, besides perception must be cultivated, — as judgment, discrimination, comparison, and arrangement. To form hypotheses and to test them, to detect and eliminate errors, to apply suitable means of verification, to learn to suspend the judgment in cases of real doubt, and to decide on true analogy, — all this is implied in the training of a boy's mind, and will receive proper attention, whether in the analysis of a rare flower or in the determination of the velocity of sound in various media, — whatever the branch of science the class is pursuing.

As to the subject-matter to which attention is to be directed, there will be much variety of opinion. Time is limited and the topics are numerous. But clearness and thoroughness are quite consistent with even a little knowledge of many subjects; and, inasmuch as the High School is the "People's College," here should be secured some knowledge of *all* the great divisions of science, in some one of which every pupil will find points of peculiar attraction, and be led to pursue further inquiry. But for all the sciences to be treated thoroughly and with something of completeness the school life is too short; and we must so simplify our methods as to bring the course within practicable limits.

The principal departments of *Natural History* relate to the sky, the atmosphere, minerals, plants, animals, or, — in a sense comprehending them all, — to Physical Geography. The chief *Physical Forces* are cohesion, gravitation, electricity, chemical attraction, and vitality. Our problem, then, is how best to secure a fair acquaintance with the facts, principles, and the most suitable methods of study, of these branches of science. For though in some cases it might be well to restrict the number, say, to two, as

branches. They grow and decay. . . . . They are not accidentally created. We are not their voluntary creators. They breed in us and issue from us, not only from our lips, but from our brains, by laws as regular and permanent as those which govern the conception and birth of broods of fishes, birds, or serpents. *Language therefore must be a department of natural history.* New expressions or idioms appear upon the face of human society just as new species and varieties of animals and vegetables have successively made their appearance upon the surface of the earth, and in the waters of the sea. And words and languages perish and are preserved in the history of literature, precisely like those fossil forms of extinct plants and animals which we study in the geological deposits of the past." [I. Peter Lesley.] Those students of philology, however, will be found the most expert and successful whose minds have been trained to habits of careful observation, comparison, and classification through the study of Science.

botany and chemistry, which illustrate most simply and satisfactorily methods of observation and experiment, — yet, to secure a wider view and to suit more various tastes and capacities, it will be better to take a fresh study every half year, covering three or four years in the course. The following scheme is proposed: —

First year. — Elementary Physics and Botany.
Second " Mechanics and Zoölogy.
Third " Chemistry and Geology.
Fourth " Electricity and Astronomy.

It must be remembered that mathematics, language, and history are going on in parallel courses. Now these more abstract studies afford each day as much hard work, real mental drill, as is well for most boys and girls to undertake at this important period of their physical and mental growth, — when through careless or unwise, excessive strain, many a boy, and especially many a girl, falters on the way, loses a year of study, and perhaps, the power of satisfactorily working for all time after.

All other branches of a school course besides mathematics, history, and language, may accordingly be taken up by easy methods, which will not be the less efficacious because not burdensome; while it is no objection that they afford valuable discipline as well as information. The dullness and harm of "perpetual grind" a well-managed education will make impossible. The actual book study will be not less intense, but more so, though there will be less of it. Not less time given to school occupations; but half of these will be light and attractive, as now they are often dull and repulsive.

To secure this desirable result we must have a more extended and more methodical use of *Oral Teaching*. Not talks, not lectures, however instructive and entertaining; but teaching in which the subject is first presented by the instructor, with questions both from him and from his pupils, with illustrations through object and experiment and inferences, analyses, classifications, and compendiums made by the teacher and class together, first indicated in outline on the blackboard, and afterwards more fully delivered in writing.

The great teachers in all ages have deemed it their province *to teach*, to adapt words, tone of voice and manner, to the special

needs of their pupils; to study *them*, with their various qualities and conditions of mind, and so to develop the ideas involved in each day's lesson that the hour may be to all a time of healthful and delightful mental play. The means employed may be a lump of coal, a vibrating cord, an apple-blossom, a bit of phosphorus, or a few inches of copper wire. Whatever the topic, the pupil's mind is alert to observe and to reason, and the knowledge got is real and lasting.

It may be urged that the only suitable means to secure the end desired is laboratory practice by the pupils themselves. It is doubtless the best and an essential means for pupils somewhat more advanced, or for the few whose subsequent course of study or life business may be thus directly prepared for. But in most of our high schools such complete laboratories, either physical or chemical, are not and will not for a long time be provided; and if they were, the time, labor, and expense involved would make their exclusive use for the majority of boys and girls less valuable than the simpler course here proposed. A *laboratory* is of course required, where the teacher, with assistants detailed from his class, may make all the material preparations for his conversational class-work. The same room, too, can be used as a *workshop*, with bench, vise, foot-lathe, wood-working and wire-working tools, where all simple apparatus needed can be made, fitted, or repaired. Here many a boy, dull perhaps at algebra or Latin, will disclose skill and serviceableness little suspected before; while the reaction of this manual training upon his mental character will serve to develop in him elements of honorable success in his future course in school and in after life.

It remains to set forth in greater detail the separate courses in science above mentioned. For schools with three terms a year the lessons might come in two of them,—say in Fall and Spring,—three times a week; and with two yearly terms twice a week; or the course may extend over a larger number of years. That is, each course may comprise from thirty to forty lessons, their topics and arrangement to be determined by the proper authorities. The courses proposed below have proved very satisfactory in schools widely differing in size and condition.

I. ELEMENTARY PHYSICS.

1. Cohesion. 2. Resulting forms of bodies. 3. Density and hardness. 4. Strength and elasticity. 5. Adhesion between

solids. 6. Adhesion between solids and liquids. 7. Absorption of gases. 8. Properties of gases. 9. Atmospheric pressure. 10. Pressure of liquids. 11. Specific gravity. 12. Siphons and pumps. 13. Expansion by heat. 14. Conduction of heat. 15. Convection of heat. 16. Change of state by heat. 17. Specific and latent heat. 18. Sound. 19. Musical tones. 20. Radiation of light. 21. Reflection of light. 22. Refraction. 23. Colors, tones and hues. 24. Association of colors. 25. Static electricity. 26. Dynamic electricity. 27. Magnetism.

II. BOTANY.

In this course the topics cannot well be indicated beforehand, as they should, with rare exceptions, be based on what specimens of wood, leaves, flowers, or fruit are at hand, though, after a dozen lessons, a textbook should be used to aid in analysis. The class have their specimens at a working-table, with knives, needles, magnifying-glasses, pencils, and notebooks. The teacher, near them or at the board, directing observation, asking and answering questions, will secure results, if not very extensive, yet real and serviceable, both as to the knowledge got and the faculties trained.

III. MECHANICS.

1. Motion and force. 2. Momentary force. 3. Constant force. 4. Gravitation. 5. Combination of forces. 6. Action and reaction. 7. Equilibrium. 8. Stability. 9. Circular motion. 10. The pendulum. 11. Simple machines. 12. The lever. 13. The wheel and axle. 14. The pulley. 15. The inclined plane. 16. The wedge and the screw. 17. Prime motors, — weights and springs. 18. Muscular and wind power. 19. Water-power. 20. Steam-power. 21. Heat and electric-motors. 22. Connections of machinery, and transference of power. 23. Mechanical energy. During this course, practical and theoretical problems that require drawings and calculations, should frequently be given, and visits made to mills and other works in the neighborhood.

IV. ZOOLOGY.

The remarks made under the head of Botany would also apply here, if it be thought best to study animals after the same manner

as plants. Not only, however, is this unnecessary, but other methods will give useful and pleasing variety. An occasional dissection of some organ before the class, or the study of single bones, or of complete skeletons is very well, and even necessary to give a true notion of comparative anatomy. But for humane and æsthetic reasons, the attention should be mainly directed to *entire animals*, — their outward forms, coverings, habits, movements, food, habitations, voices, and such parts of their structures as can be seen *without mutilating them*. Here is an opportunity for bright pupils to make the pleasant acquaintance of such authors as Wilson, Audubon, Agassiz, Lubbock, Wallace, Thomas Edwards, and Gilbert White, and visits to Zoölogical Gardens and Museums will be invaluable. As to the use of textbooks, except as a guide to the instructor, the objection here, as in other departments of science, is that they are apt *to leave the powers of perception and comparison untrained*, and all the knowledge acquired is at second-hand. Textbooks may serve as occasional help and for verifying the observation, and the works of the great naturalists as source of inspiration; but the *school work* should be practical and by the inductive method. To help in the work the pupils should be led to note the arrival and disappearance as well as the habits of birds and other animals, and to write descriptions of breeds of horses, dogs, fowls, and cattle.

V. CHEMISTRY.

As chemistry illustrates, perhaps, the best methods of experiment, and as the pupil has now arrived at his third year of scientific study, he should be required to take part in preparing materials for the class lessons. Under the teacher's direction, then, he bends and fits tubes, weighs materials, makes triturations, solutions, filtrations, and decantations, and by degrees becomes acquainted with other processes of the laboratory. From the numerous subjects the science presents, a selection is made of the most useful, for the teacher to develop in experimental and conversational lectures, in which the main points are to be carefully taught, and the important manufactures depending upon them described, — as of soda, iron, steel, glass, white lead, and illuminating-gas.

The following topics are suggested as appropriate to such a course: —

1. Apparatus and materials. 2. Illustrations of chemical ac-

tion. 3. Water and hydrogen. 4. Oxygen. 5. The atmosphere and nitrogen. 6. Chlorine. 7. Sulphur. 8. Phosphorus. 9. Carbon. 10. Silicon. 11. Combustion. 12. Chemical elements. 13. Chemical compounds. 14. Chemical equivalents and stochiometry. 15. Potassium. 16. Sodium. 17. Calcium. 18. Magnesium. 19. Aluminum. 20. Iron. 21. Zinc. 22. Copper. 23. Mercury. 24. Lead. 25. Silver. 26. Other metals. 27. Alloys. 28. Analysis. 29. Mineral poisons and their antidotes. 30. Organic acids. 31. Fermentation.

VI. GEOLOGY.

At this stage of his progress the pupil is advanced enough to understand something of the *theories* of geology; and a few lectures with charts and sections will be of much service, — lectures on glaciers, mineral veins, earthquakes, etc. But such lectures should be a sequel or incidental to the course itself, which in its details must depend, as that in botany, on circumstances of place and time. In cities a mineralogical and geological cabinet would furnish opportunity for most useful lessons, each pupil having a specimen of the substance studied, and determining and recording its physical character. First the simple minerals should be examined, afterwards the igneous rocks, and lastly the stratified formations. A similar course is even more practicable in the country, where visits to river-beds, railroad cuttings, and quarries, will add much interest to the lessons. Specimens should be collected and labeled for cabinets, exchanges set up with other schools, and study made of the features of the landscape and the nature of the soil depending on geological causes.

It is not necessary to give a detailed statement of topics for the two remaining branches of science. Electricity will be pursued chiefly through experiments and astronomy by observation, and in the latter, care must be ensured that through evening lessons acquaintance be made with the principal stars and constellations.

Is it objected that the method here presented makes too heavy demands upon the teacher? To prepare for each day's classwork, to conduct the lessons and to criticise the pupil's papers, calls, indeed, for much time and labor, — especially the first season it is undertaken. But many of the details can be turned over to the more active, advanced, or willing pupils; a good textbook

will save him much trouble, and the method itself is elastic enough to allow, without harm, a good deal of variety.

Let us see how a lesson in science may be conducted by this method, taking for a subject *The Pendulum*, from the course in mechanics.

The teacher hangs to a hook a weighted cord three or four feet long, and drawing it to one side allows it to swing several times back and forth, and asks the pupils what they have observed. One replies that the weight is carried each time nearly to the height of the starting-point. Another, that the swinging is in one vertical plane. A third, that the speed of the downward motion increases and that of the upward diminishes. A fourth, that the time of oscillation is constant. These replies are all considered and noted down; but the last one is emphasized.

What causes this regularity? Perhaps the amount of the weight. So cords with various weights but of equal length, — for the necessity of altering only *one* condition at a time has been made familiar by previous instruction, — are arranged as before, and the independence of the rate of oscillation on weight is shown.

Next, the weights are allowed to swing through longer arcs, and this change is found to make no difference in the time of oscillation. Similar trials are next made with cords and stiff rods of various lengths with weights attached, and it is soon decided that the rate depends on the *length* of the "pendulum," as the rod may now be called.

What relation exists between the length and the oscillations? To determine this, the cord is shortened till the swing is twice or three times as fast, and lengthened till it is twice or three times as slow; and careful measurements, which the pupils should make, show that the time of vibration is proportioned to the square root of the pendulum's length. The formula $T \propto \sqrt{L}$ can then be given and explained.

Will a seconds pendulum beat seconds at all points of the earth's service? Actual observations can be quoted and their relation shown to the spheroidal form of the earth.

The structure of the mercury and the gridiron pendulums can next be explained with objects or diagrams, and a particular description be given of the pendulum of the Observatory Clock at Greenwich.

A suspended rod when struck horizontally moves through an

are dependent upon the force of the blow. Through experiments to show this, the *ballistic pendulum* can be explained. And the principle of the *metronome* may be illustrated by attaching a weight at different points above the point of suspension, and observing the diminished rate of vibration.

Other simple experiments should be made by the class to find the centres of oscillation and of percussion, — the right points where water should strike the floats of a water-wheel, and where a bat should receive the ball.

And, finally, problems are given to be solved, both by experiment and by computation; as, "In a swing fifteen feet long how many turns can you get in two minutes?" "How many minutes will fifty turns require in a swing seventeen feet long?" "How long must a pendulum be to give twenty oscillations in a minute?"

As the lesson proceeds, an analysis of it should be put upon the board and copied by the pupils.

It is claimed for the plan here advocated of teaching Science in Secondary Schools, that

First, it gives, at comparatively small expense, opportunity to learn the leading facts and principles of *all* the great divisions of Natural and Physical Science.

Secondly, it secures some knowledge of the materials used and understanding of the processes employed, in the *manufacturing industries* dependent upon these sciences.

And, thirdly, it leads to a love of nature, a development of the pupils' intelligence and practical powers, and, not least, the *habit* of investigating both the facts of the outward world and the works of the great scientists.

It is not a valid objection that this plan does not meet the scientific requirements, say, for entering Harvard College. It is a good, perhaps the best, *introduction* to such requirements; and a years' drill in chemistry, physics, and mechanics, will be so much the easier and more valuable *after* the course here presented. For such others, also, as have the taste and the time, a similar special course in laboratory work will be quite as practicable. But by the great majority of pupils in our secondary schools enough can be learned in this general course to give pleasure in the getting and satisfaction in the possession, and incitement to further investigation in a most interesting realm of knowledge.

THE NEW EDUCATION IN CALIFORNIA.

BY MRS. C. D. ADSIT.

WHAT is known as the new education, is the practical development of theories expounded, principally by Pestalozzi, Froebel, and Herbert Spencer.

Pestalozzi, who is called "the father of popular education," based instruction upon the development of the human powers from within, outward, and insisted upon the self-activity of the pupil in production as well as in assimilation.

Froebel based his kindergarten system of education upon the same idea, but urged that this training must begin in infancy.

Herbert Spencer insisted that in education "the question is not the intrinsic value of knowledge so much as its extrinsic effects on others," and that the true function of education is "to prepare for complete living; not how to live in the mere material sense only, but in the widest sense, the right ruling of conduct in all directions under all circumstances; how to use our faculties to the greatest advantage of ourselves and others.

Many notable educators, have, from these theories, practically developed an educational system that trains all the faculties. The Kindergarten is established in nearly every state in the Union. In a few states manual and industrial training are incorporated in the high school and university courses of the public school system. Technical institutes offer facilities for the acquirement of a knowledge of the industrial arts. Thus has the new education advanced in the United States during the past twenty-five years, but has not kept pace with many European countries.

California has, however, had an exceptional growth in the educational work that prepares for "complete living." The history of free kindergartens in this state is full of interest. Ten years ago there was not a free kindergarten west of the Rocky Mountains. There were in 1888 over thirty in San Francisco alone. No city in the Union has made such rapid strides in educational work among the children of the poor. This is owing to the fact that many persons of wealth have been induced to study the work

for themselves, and becoming convinced of its value have generously given money for the support of free kindergartens. There are at present over three thousand children attending the various kindergartens in San Francisco, all of which are supported by private contributions. These children are too young to be admitted to the public schools, their ages ranging from two and a half to six years, and would otherwise be receiving the vicious training of the streets. In the kindergarten they are taught habits of cleanliness and industry. They are clothed and fed if necessary. Their development, mental and physical, is in a healthy direction.

Mrs. Sarah B. Cooper, President of the San Francisco Golden Gate Kindergarten Association, who has devoted herself for the past nine years to the upbuilding of this work in California, outlines the plan of kindergarten work in the following words: "Take the very little child into the kindergarten and there begin the work of physical, mental, and moral training. Put the child in possession of his powers; develop his faculties; unfold his moral nature, cultivate mechanical skill in the use of the hands; give him a sense of symmetry and harmony; a quick judgment of numbers, measure, and size; stimulate his inventive faculties; make him familiar with the customs and usages of well-ordered lives; teach him to be kind, courteous, helpful, and unselfish; inspire him to love whatsoever things are true and pure and right and kind and noble, and thus equipped physically, mentally, and morally, send him forth to a wider range of study which should include some sort of industrial training, and still further give the boy or girl a completed trade. Thus will they be prepared to solve the rugged problem of existence by earning their own living through honest, faithful work."

Who can doubt the good results of the successful carrying out of such a rational plan of education as this? It would be an important factor in the solution of social and industrial problems that are confronting us, pressing for solution.

The last annual report of the Golden Gate Association contains a tabulated statement of its progress. The close of the first year's work gave two classes with an enrollment of 109 children, and cash receipts of $1,805.70. At the close of the eighth year there were 15 classes with an enrollment of 1105 children, and cash receipts of $17,307.50. The association has organized fourteen kindergartens. Eight of these are supported by Mrs. Leland

Stanford, who has given $40,000 up to the present time, and is also engaged in the work, the Menlo Park and Mayfield schools being under her supervision.

Kindergartens are also sustained by Mrs. Crocker Alexander, Mrs. Senator Hearst, Lady Hesketh, and the Produce Exchange of San Francisco. Benefit amateur entertainments are often given to aid them, and donations of fruit, flowers, and clothing are applied to what is called the "Home Fund," which assists the needy families of the children. The progress and good behavior of the kindergarten children is noted when they enter the public school. They take a good standing, and in almost every case promotion follows the first term and all do well. This has led to the general agitation of the subject of establishing the kindergarten as an integral part of the public school system.

The homes of these children are also affected. The little ones grow healthy, happy, obedient, and industrious, and carry good habits and cheerful dispositions into their homes. The teachers work in the homes as well as in the schools. They are often called to settle family disputes, to advise perplexed mothers, and to protect some of their little flock from the severities of drunken mothers and the neglect of besotted fathers. When we reflect upon the condition of such homes, we must bestow unstinted praise upon the women who thus go into them to carry out their educational work with little children. "Children are the hope of the world," is the motto of the kindergarten. "To neglect the children of the poor is to invite national peril" is the watchword of California's citizens in this, her magnificent undertaking — the fitting of the children of the poor for good citizenship. Upon this, the safety in prosperity of every state depends

This history of the growth of kindergarten work will lead to the natural expectation that California is in advance in all educational work. That this true, is shown in the 13th Biennial report of Ira G. Hoitt, Superintendent of Public Instruction of the State California, ending June 30, 1888. California as a State is generous in educational affairs. The total number of public schools in 1888 was 4002, the total number of census children enrolled, from 5 to 17 years 270,500, the total expenditures $4,321,381.50. Although the superintendent finds the schools by no means perfect, he yet finds the people of the state receiving an equivalent for the appropriations, and the teachers, as a whole, doing good

thorough, honest work. He says California pays her teachers a higher average salary than any other state in the Union, though the principals in the large cities receive less than the principals of schools in some of the large cities of the East, and that it is to the credit of the state that the same salary is paid to women teachers as to men when doing the same or similar work. The school buildings are models of beauty and convenience, and constructed with regard to the health and convenience of both teachers and pupils. The state furnishes textbooks at cost, as the present provisions of the constitution will not allow free textbooks. Strong efforts are, however, being made to amend the laws so that the use of textbooks shall be free to all children attending the public schools.

The proposition to make the public schools to some extent manual training schools is under serious consideration, and there is little doubt that this will be done, the more especially as the state is to have one of the best appointed institutions for manual training in the Union — the Stanford University, where the value of the system of training hand and brain together will be exemplified.

It has been the privilege of the writer of this article to study the progress of educational work in California, during a seven months' residence in the state. The facts contained therein have been gained by personal observation and from data kindly furnished by prominent educators. The noting of these evidences of development in the direction of the new education in California has been a source of gratification, the more that we are now confronted with the humiliating knowledge made manifest in the educational exhibits at the Paris Exposition, that the United States is taking the lowest place among nations in the advancement of the education that prepares for "complete living." Proportionately to the money spent upon our public school system we are teaching less of that knowledge which is of the most practical value than many other nations. We are adhering the longest to the pedagogy that is exclusively mental, thus failing to secure the objects which alone justify the education of children at the public expense.

These proofs of a marked development in the practical training which fits boys and girls to earn a livelihood through "honest, faithful work," is of especial interest at this time.

Tuesday, April 16th, an opportunity was offered for a visit to Menlo Park and the Leland Stanford University. The day was one of California's best, and the reach of country interspacing the railway station and the university grounds beyond powers of description. Winding through miles of bloom, dotted with the magnificent live-oaks, with the gracefully swelling foot-hills, flanked by the mountain ranges, hemming in all this beauty, the first point of observation universityward was anxiously looked for, and when gained was a most sudden and — let the truth be recorded — disappointing surprise. Looking down upon the university buildings, from the slight elevation, they seemed to possess no impressiveness, architecturally or otherwise. A quadrangle of twelve one story buildings confronted the vision like a series of "machine shops." This, however, was a mere optical illusion produced by the angle of observation. Once within the quadrangular structure, there was vastness and impressiveness. The comprehensive plan was seen to be carried out in detail with strict regard to the purposes of the structure. The most approved methods of modern scientific construction have been used. The design was an expression of utility. There was no sacrifice of fitness to please the eye as is so often seen in the architecture of educational institutions. It was in harmony with the broad, practical scope of the work which is to be carried on in the university. The presence of the large-minded originator and benefactor of the university, Hon. Leland Stanford, gave an added effect to the entire impression as the full meaning of the undertaking was made known and came under attentive consideration.

In an interview with a member of the reportorial staff of "The Daily Examiner," on the evening of the same day, Senator Stanford expressed his determination to provide a thorough course of instruction for all who might choose to avail themselves of the advantages his invitation proffered. He said, "I am particularly anxious that the young men who are by thousands graduated from the colleges of the land and sent forth weaponless, so to speak, shall find here an opportunity to take up some specialty. We shall teach the classics; in fact everything, beginning with the kindergarten; but we shall also teach the specialties, so that young men and women will not be without a knowledge of a specialty on graduation. We shall fit all the students for some active calling in life. I hope the university will have a character and

standing from the start. Eventually, I hope that it will have several thousand students. The real problem is, *how to realize the possibilities of the students.*"

The benefit of such an institution of learning, nominally free to all who desire to enter it, rich and poor to be on an absolutely equal footing, cannot be overestimated. Its aim — that of fitting young men and women for honest self-support — is the need of the hour. To promote this, manual training will be a feature of university work. Mind training is to be accompanied with the training of the eye and hand throughout the entire course of instruction. The result of this method will be to graduate the skilled artisan who is also the intelligent individual. It will dignify labor; for the dignity of labor depends to a great degree upon the intelligence of the laborer. As "labor includes all human exertions in the production of wealth," social reform demands the education of the laborer. There will come a new understanding of the relative value of labor in the progress of civilization through this co-education of the hand and brain, in the establishment of manual training in all schools, colleges, and universities.

There is often a confusion in the mind of the terms manual and industrial training, that needs correction for the benefit of any who do not distinguish the difference between them. Manual training does not extend to the sphere of industrial or trade training, which is adopted in polytechnic institutes and industrial schools. Manual training simply cultivates the hand to precision and deftness in the use of tools, at the same time exacting and enforcing attention and persistence. It supplements the kindergarten in the creative method of education, and gives the pupil the power to undertake industrial or trade training later on, if the bent is in that direction; if not it makes him, as we say, "handy." To educate the mind and not the hand, is to make the child one-sided for life; unskilful and helpless in the event of misfortune. It is the lack of this co-education that augments the army of the unemployed from the ranks of college-bred young men and women.

Owing to the misapprehension of the meaning of manual training, workingmen often raise objections to its introduction into the public school system. They consider it an interference with the customs of the trades apprenticeship, and perhaps, with a large class of persons, they cling to the notion, fostered by the exclusive mind training of our educational system, that manual training

takes the time and attention that should be given to books. To this class, book learning alone means education. These ideas and notions will be eradicated when manual training is established as a part of school instruction and the improved economic character of our country through its influence has been demonstrated, as it has been done in France, Switzerland, and notably Belgium, in its effect upon the industrial arts and the condition of the laboring class.

California has as yet no manual training in her public schools. Industrial or trade training which should supplement but not supplant it has gained a substantial footing. The general agitation of the subject in this state will doubtless soon succeed in the establishment of manual training in the public school system.

The Cogswell Polytechnic College of San Francisco provided a course in mechanical arts for boys and industrial arts for girls. Later on, the theoretical idea that these classifications are a sex necessity will vanish and the opportunity of achievement be opened to both sexes in parallel lines. This college occupies grounds which with its school buildings, shops, and laboratories, form the finest outfit for industrial training in the United States. The college is endowed by one of California's generous citizens.

California is greatly indebted to Prof. C. H. McGrew, whose work has been emphatically the advancement of the new education. Professor McGrew is a graduate of the Iowa State College of Science and Mechanical Arts and post graduate in psychology and in the science and art of teaching and kindergarten. He has been, until very recently, in charge of a training school for teachers in the University of the Pacific at San Jose. During the past three and a half years he has conducted twenty-five different institutes in as many different counties in California, and delivered forty-five lectures to the people and to teachers, beside his schoolroom work. The emphasis of this educational work is in expounding the psychology of childhood, and he has now in preparation a work on this subject. He has designed two "plates" illustrative of "Harmonious Education" and the "Psychology of Childhood," graphically exhibiting the character of the work and development of the ideal school.

Plate I. is called "Harmonious Education" and aims to represent the full, rounded, harmonious education of the child from the kindergarten to the university, according to the tested and ap-

proved principles and methods of the new education. The plate is in the form of eight concentric circles, the inner circle representing the child's early life from birth to kindergarten age. The outer circles each represent two years' work and development, the work being adjusted to the child's growing capacity, the last circle showing the application of mathematics, social and physical science, language, graphic, plastic, and manual expression and the arts.

Plate II. called "Psychology of Childhood," is in the same form, the inner circle representing sense, instinct and play-life, the others the unfolding powers and growing capacity and skill of the child. The developing powers of the child, as delineated, range through the eight circles in groups of physical, mental, and intellectual instincts and impulses that lead up to the social and ethical character in the outer circle comprising the affections, ambitions, passions, perceptions, beliefs, emotions, etc., which make up the fully developed human being. "The child is here studied," explains Professor McGrew, "as a physical being of sense, instinct, feeling, thought and volition, together with his nature as influenced by heredity and environment; as a creature of natural history, a part of nature, having a life history in nature and subject to all her laws."

By this illustration of child-life, Professor McGrew intends to convey the results that have been reached by an inductive study of the growing child where psychology has been regarded as a natural science, having to do with every side of human nature, and little regard has been paid to the abstract metaphysical speculations of the older treatises. The aim of this work is to make the laws and principles of natural childhood the study and guide of teachers, the Professor always insisting that teaching is above all other professions, requiring for its success the broadest culture, the best skill and ability, and the fullest insight and consecration. That the new education has essentially to do with the child, that a knowledge of childhood, of the laws and methods of its development is the secret of the whole process of education, is the conscientious conviction of this great educator. He has imparted this conviction to the citizens of California, thousands of parents and teachers having listened to his lectures and read his profitable treatises on "Child-life" and "Ideal Schools." His work has borne abundant fruit in the advancement of the new education in

California. Together with Mrs. Cooper, Professor McGrew has inspired that educational enthusiasm which has found expression in free kindergartens, manual training universities, and polytechnic colleges. These munificent benefactions, inspired by the self-sacrificing labors of these progressive, practical educators are California's acknowledgment to the value of the new education. In turn, these teachers acknowledge in graceful words their own indebtedness to the leaders in educational reform in this country, to Professors Haillman, Parker, Harris, MacAlister, Felix Adler, and others, and to that noble woman, Elizabeth Peabody, who sowed the seed of kindergarten education in the United States.

The kindergarten is the foundation of the new education. The symmetrical superstructure rises with an ethical significance that appeals to social reformers. The education that is not exclusively mental; that develops all the human powers in all healthy directions; that prepares men and women for the grave responsibilities of living; that equips them to live by honest labor; that teaches them that all labor is honorable; that inculcates integrity of character; that graduates the good citizen, is an education which will help to correct existing social evils. The regeneration of society is within the scope of the new education, for it contains in its possibilities the germ of every essential reform.

LIMITATIONS.

BY ELIZABETH PORTER GOULD.

"Would that my acts could equal the noble acts I 've told,
Would that I could but master myself as visions bold!"

So cried a famous artist in agony of soul
As waves of great temptation before him high did roll

"Oh, would that I could body the thoughts that govern me,
Oh, would that I could picture the visions I foresee!"

So cried a saintly woman in ecstasy of pain,
As waves of sad depression rolled on her soul to gain.

EDITORIAL.

THE legislature of Minnesota has passed an act fixing the name "Elk Lake" to the little lake now recognized as the source of the Mississippi River, just above Lake Itaska. The act also prohibits the use of any geography hereafter published which shall give any other name to this lake. The Minnesota Historical Society has sent out a circular calling attention to this action of the legislature, and has also published a printed report upon "The Sources of the Mississippi, their Discoverers, Real and Pretended," which they will mail free to any one writing to their secretary at St. Paul. All this very properly grows out of an effort by Captain Glazier and his friends to fix his name to this lake.

THE new Indian Commissioner, General Morgan, has begun his work with great vigor and evident good judgment. For some years the Government has been carrying on a system of contract schools for the education of Indians, in connection with different denominations. These seem to be parochial, or church schools, subsidized by the Government. This is, at least, a questionable policy, and it will commend the new commissioner to the educators of the country when it is known that he has refused to authorize any new schools on this basis, and has announced his policy to develop a system of government schools, modelled on the public school system, adapted to the wants of the Indian, and adequate to the education of the entire Indian population.

PROF. WILLIAM S. LISCOMB of Providence, R. I., lately instructor in Brown University, has accepted a position as professor of the English Language and Literature in the College of the New Era, Tokio, Japan, and with his wife has just started for San Francisco on his way thither. This is an old college with one thousand students. A wealthy Japanese, Mr. Fukuzawa, has lately endowed three new departments for university work, designed to be upon the same level as the Imperial University. Mr. Fukuzawa empowered Rev. Arthur May Knapp, who has just returned from Japan, to engage three distinguished American scholars to occupy the chairs of these new departments. Mr. Knapp has engaged Prof. John H. Wigmore, a graduate of Harvard, as Professor of Law; Mr. Garritt Droppers, also a Harvard graduate, as Professor of Political Economy; and Professor Liscomb in the department of English Language and Literature.

THERE are several marked tendencies just at present in the school-book trade, and the supply and use of textbooks in the public schools of the country, which may well challenge the thoughtful attention of educators everywhere.

1. For some years publishers have been vying with each other in their efforts to furnish books of the most sumptuous make-up, — displaying the most elaborate art work, in type, paper, illustrations, maps, etc. This fashion has been carried quite far enough, and a halt, on the score of expense, may well be called.

2. The Massachusetts free textbook law has proved a precedent which other states are quite inclined to follow. The law is undoubtedly sound in principle, and with an important modification will be found successful and useful in practice. It is well that the schools be made absolutely *free* by furnishing, not merely free schoolhouses, teachers, and general supplies, but free textbooks and reference-books, and stationery. Now let the old-fashioned, antiquated, and half civilized slate and pencil become as they deserve, entirely obsolete, and let the paper and lead pencil take their place. But where the state or municipal law makes the books free to all, it should also, *in all cases*, provide that after any pupil below the high school has used a book one school year, it shall become *his personal property*, and be no longer a loan; and after any pupil in the high school has used a book one-half a school year, it shall become his.

3. The withdrawal by the publishers of their travelling agents is a measure perfectly legitimate if the publishers so choose; but it will not prove so much a blessing to the schools and the committees as is evidently thought in some quarters. A late number of the *Boston Advertiser* calls this movement a "School Book Trust." But is it in any sense a "trust." This word is generally understood to mean a combination of traders with capital, by means of which an article of commerce is so controlled as to raise the price and affect consumption. This movement by the publishers is certainly not a trust in any such sense. The article just alluded to asserts that the book agents have of late offered "inducements of one sort or another to school committees to secure the exchange of standard books and the introduction of those which they have to sell." It furthermore says: "Changes have been made in bewildering succession until, in some places, the absolute loss to pupils in these rapid transitions has been even greater than the cost involved in displacing one set of books, still in good repair, merely at the transient whim of the committee." "Not only here in Boston, but in many places in Massachusetts, textbook changes have been made, for which no real excuse has ever been given, but which have been ex-

plained in the trade by statements that showed that the personal interest of members of the school committee was at the bottom."

Now, this is a severe charge, and apparently as malicious as it is false and groundless. Did the writer of the article know that the law of this Commonwealth distinctly prescribes that no new textbook can be introduced without a two-thirds vote of all the members of the school committee?

The fact is, both in Boston and in other places in Massachusetts, that it is an exceedingly difficult matter to get even a bad textbook out and a better book in.

4. The California plan, of the state making its own textbooks, is as irrational and nonsensical as any plan could well be. When the plan has received a fair trial the people will be quite disposed to let the law of supply and demand control this as well as all other productions.

5. The Indiana plan by which the state law "establishes a monopoly by giving the manufacture and sale of books to one person only, fixing a price for them and cutting off all competition" (as the *Chicago Tribune* puts it), is as wicked and indefensible as it is unwise and impolitic. A case has been brought in the courts by one of the New York publishing houses to try the constitutionality of the law. It is claimed that the law is in contravention of the federal constitution and of good government. The decision of the court in this case will be looked for with much interest, as it "affects" (so says the *Chicago Tribune*), "not only the rights of this particular firm from a commercial point of view, but great questions of public interest, such as popular rights and legislative powers, the binding force of contracts, the definition of fundamental doctrines in the federal constitution, as affected by the law, and the extent to which private rights can be infringed by monopolistic corporations, reinforced by partisan sanction."

It is to be hoped that this case, when decided, will put an effectual extinguisher upon all such attempts to block the ordinary avenues of trade, and create "monopolistic corporations" at the expense of the rights of book publishers, book sellers, parents, children, and committee men.

THE general interest in educational subjects, as evinced by the frequent articles and broadsides in the daily and weekly secular press, the religious papers, and the more stately monthlies and quarterlies, is a favorable and altogether healthful and gratifying sign of the times. No one should fail to read the various articles in the *Independent* of August 29th, in answer to fourteen questions sent out by the editors of that paper. These contributions are from the pens of some

of the best thinkers in the land, including Secretary Dickinson, Doctor Curry, General Armstrong, Bishop Keane, Senator Blair, Doctor Mayo, Doctor Warren, Doctor Merrill, and many others. The discussion is admirably summed up in an editorial, from which we beg permission to make liberal quotations, as the best way of setting before the readers of this magazine the general drift of thought upon the several important topics discussed. Referring to Secretary Dickinson's paper the editor says: —

"In no state has the public school received more attention and care than in Massachusetts, and we are pleased to have so hopeful a view of its results. The Secretary of the Board of Education of that state recognizes imperfections and dangers, but he tells us that a system must be judged by its fruits; and judged by its fruits, our public school system stands very high. We believe him, but we also believe that in no other nation has the public school had so much to help it. If an intelligent, self-reliant, enterprising body of citizens have come out of the public schools of Massachusetts, they have been educated, not only in those schools, but in an atmosphere of political freedom and religious independence and faith, such as no other country in the world can supply. The dangers to our public schools and their deficiencies, Mr. Dickinson also suggests."

Upon the topic of the higher education, this editorial expresses itself thus: —

"We have not answers enough to our questions about a free higher education to base full comment upon. It will be noticed that the Head Master of the Boston Latin School, while deprecating aid which will cheapen education, yet would have the instruction free in schools fitting for college; and we do not see but this would carry with it free tuition, and nothing more, in colleges and technical schools."

When "Education at the South" is discussed every one rises as to a question of great interest, and expresses his opinions in no uncertain way. The summing up of this discussion is so handsomely done by the editor that we quote it entire, desiring especially to give an emphatic and hearty endorsement to his opinion: —

"The chief question is seen, even more clearly than we expected, to be whether aid should be given from the National Treasury to the public schools of the South. The weight of opinion is strongly in favor of such aid. There is no doubt that the South has made wonderful progress in its free schools during the past twenty years, but it is utterly impossible for the South of this generation to educate its children. This is the cold fact, and this fact requires that in some way help should be given. No man knows better than Doctor Curry, Secretary of the Peabody Educational Fund, who has traveled over the whole South year after year, addressing every Southern legislature on the subject, and studying the matter with the utmost care. We know of no other man in the South whose opportunities for judgment are equal to his. He is a Southerner, a Democrat, a Virginian, a scholar, and a Christian; and he says, as the result of his long study — and he puts it in italics: —

'*It is impossible for the Southern States, on present values of property, by any rate of taxes short of confiscation, to furnish free instruction to both white and black youth.*'

"When we add to this impossibility the fact that, by the last census, there were six million children in the South that did not attend school, that sixty per cent. of the Negro children attended no school, and that there were two million voters who could not read, then the significance of this financial inability to provide education becomes alarming.

"Then let one read Doctor Mayo's article. He has, under Unitarian direction, devoted years to travel in the South, endeavoring to develop an interest in education, especially of the whites. He has been on the best of terms with the leading and controlling people in the South. He knows the ability of the South and what are the views of the best citizens. He says that the present generation of the South cannot educate a larger per cent. of the population than they do now, giving less than four months of school, with cheap teachers and almost no helps of instruction in two-thirds of the states. Even Texas, the most favored state, has but three thousand schoolhouses for eight thousand country schools. The fifteen million dollars raised by taxation in the South for public schools represents, says Doctor Mayo, a greater sacrifice to education than any other part of the Union can show; and yet he adds,

'The condition is by no means what it is described by several classes; the speculative investing people who desire to bring Northern emigration southward; the boastful local crowd that always magnifies home conditions; and the large number of Northern metropolitan journals who, for various reasons, within the past few years have flooded the North with accounts of Southern education thoroughly unreliable.'

"Professor Salisbury, who knows the condition of Southern education very thoroughly, confirms Doctor Mayo's statements; and, while appreciating what the South in its poverty has done, yet indicates the pitiful condition of the schools as seen in the absence of school buildings, for which no provision is made, except in towns, and the fact that Georgia gives for public schools less than one-fifth as much *per capita* as Wisconsin.

"The argument against national aid to public education is given by Mr. Edward P. Clark, who has much to answer for as the inventor of the nickname for the Blair Bill, which he first called a bill for the promotion of mendicancy. Mr. Clark gives three arguments against national aid. The first is that it is unconstitutional. But the Senate has repeatedly expressed a contrary opinion. The second is that it would check the local interest in education, and promote mendicancy. But mendicancy is not promoted in Massachusetts when the state supplements city and village taxation by giving aid on condition of raising a certain amount by taxation. Education will never produce mendicancy, unless most stupidly offered. His third argument is that federal aid would be class legislation. We can see no reason in such a statement. We cannot imagine what it is based on. If any one sees any reason in it, let him read Mr. Cable's article. We fully believe that the nation owes it to the states which inherit the ignorant white and black masses of slavery to aid in their education. Senator Blair deserves the thanks of the people for his strenuous perseverance in this matter, and whatever objection to it there is in the South comes chiefly from those who would prefer to perpetuate a class of ignorant serfs. There is a very serious opposition in the South to public schools for all."

The remaining question of importance is the matter of parochial schools. This, too, is so skilfully and fairly summed up by the *Independent*, that we beg permission to quote approvingly his statements in full: —

"The remaining question of morals and religion in the public schools settles down to the one question whether Roman Catholic schools should receive state aid; that is, we have here a reversion of a hundred years to the proposition that there shall be no uniform system of public schools, but that the schools shall be parceled out among the religious sects. It is really amazing that a class of our fellow-citizens should make this proposal, but luckily none do it but the Catholics, and not all of them. What they want Bishop Keane tells in the most persuasive way. But neither Protestants nor Catholic laymen will allow this demand. Our public schools are full of Catholic children whose parents may send them to a parochial infant school, but when they get larger send them to the best school they can, which is sure to be the public school. We do not anticipate any growing difficulty on this subject, which such Catholic countries as France and Italy have settled just as we have.

"We are sure that our readers will agree with us that we have opened before them this week a series of questions that deserve very thorough and prolonged study. Neither State nor Church can live without the school, or, if they can, they become ignorant, superstitious, tyrannical, and a curse to the community."

FOREIGN NOTES.

GREAT BRITAIN.

Education Estimates. — In his speech in introducing the education estimates to the House, Sir W. Hart Dyke gave a resumé of operations for 1888–89. The total amount granted for the support of elementary education in England and Wales was £3,684,329 ($17,917,945). The state-aided schools afforded accommodation for 5,356,000 children, an increase of 77,000 over 1887. The number enrolled was 4,687,000, an increase of 52,000. The decline in average attendance noticed during the last two years has been overcome. It stood at 3,615,000, an increase of 88,000, or one per cent. over the previous year. The improvement in scholastic conditions was shown by the increase in the number of scholars examined in the higher standards. The total number (953,000) was 37.4 per cent. of all pupils examined, a relative gain of 1.1 per cent. as compared with 1887.

Sir Hart-Dyke dwelt with particular satisfaction on the evidences of success attending the teaching of cookery. Since 1884, when the number of girls under training in this art was 7,600, there has been a steady advance until a total of 42,159 was reached in 1888.

The effect of the Education Act of 1870 may be gathered from a sin-

gle fact. Prior to the passage of the act only 7.08 per cent. of the population were on school registers; now the number is equivalent to 16.75 per cent. The new code shows the influence of testimony given before the Royal Commission. The almost universal condemnation of the system of payment upon results has not sufficed to do away with the evil entirely, but important modifications of the system have been secured. Greater freedom will be allowed in respect both to classification and the choice of subjects outside of the elements. Freedom in the latter would, the vice-president thought, be particularly favorable to rural schools, as it would give opportunity for the pursuit of subjects such as botany, or natural history relating directly to rural life and occupations.

The education estimate for Scotland amounts to £285,376 ($1,388,640). The increase over 1887–88, viz., £14,930, is largely due to the development of the evening schools. Both in England and Scotland a new impetus has been given to this class of schools by new regulations which allow greater scope and freedom with respect to the subjects of instruction.

It is noticeable that while England surpasses Scotland in the proportion of children brought under training in the infant schools, Scotland has the advantage in the number of pupils who pass on to the higher standards.

Friends of higher education are rejoicing over the government grant of £15,000 to the provincial colleges. These colleges have all grown up within recent years "to meet the demands for higher education in great centres of population, among those who cannot afford to spend two or three years at the old universities. With the single exception of Owens College, Manchester, they are all reported to be in pecuniary straits.

The committee appointed to select the colleges that are proper subjects of the aid favored eleven out of twelve claimants. In granting the aid the Lords of the Treasury approve of the committee's recommendation, that "a person representing the government should visit each college from time to time, not with a view of examining students, but to inspect the buildings and laboratories, and to become personally acquainted with the extent of the different courses of study."

It is further declared that no one of the colleges is to be regarded as having a vested right to share even for a limited number of years in the sums voted by Parliament. The chance of so doing will depend upon evidence of continued fitness for the duties which the title "University College" implies.

The doctrine of public aid without guarantees meets with no favor in Great Britain.

FRANCE.

Development of Law Courses. — The efforts now being made to raise the standard and improve the quality of professional education in the United States give particular interest to similar movements in foreign countries. One of the most recent of these has reference to the requirements of the law course in the French faculties.

A project for extending and enriching the same, elaborated by the faculties, was submitted in January last to the Superior Council of Instruction. Here it has been carefully debated and modified with results which now await the sanction of the Minister of Public Instruction.

For many years the programme has included law under the following divisions: civil, criminal, Roman, and commercial, also court proceedings. To these subjects have been added in recent years administrative law, political economy, international civil law, and the history of law. At the present time there is in France but a single chair of the law of nations, namely, in the Paris Faculty, and one of maritime law at Bordeaux.

The new project makes provision for the following additional subjects: constitutional law, international public law, maritime law, certain matters of administrative law, industrial and commercial legislation of different nations, and the study of colonial systems. To arrange for this extension of the programme without increasing either the number of years in the course or the total number of lessons each year has been found difficult. The end it is believed will be attained by a system of electives. The proposal submitted to the Council allowed choice between two groups of study, the course in each being strictly defined. It was evident, however, that these groups presented the possibility of many combinations responding to as many special vocations, either scientific or professional. For this reason the permanent section of the Council to which the matter was referred, advises a prescribed course for two years and unrestrained electives the third.

It should be observed that the course in the French faculties of law is not regarded primarily as a means of preparation for a vocation, but as a part of liberal education. At the same time it is noticeable that the decisions of the Council have been determined in some measure by practical considerations.

The New Sorbonne and the International Congress. — The inauguration of the new Sorbonne took place August 5th, almost exactly four years from the date of the laying of the corner-stone. The scene is described as one of great brilliance; it was graced by the presence of President and Madame Carnot. The institution comprises three divisions, as follows: The Academy of Paris; the Faculty of Letters, and

the Faculty of Science. The building for the last named is in process of erection.

The newly inaugurated building was occupied by the International Congress on Higher Education, held in connection with the Paris Exposition. The congress was arranged in two sections: one for the discussion of university matters, presided over by Monsieur Bufnoir, and the other for secondary education, under the presidency of Monsieur Morel. Point and spirit were given to the discussion by a set of printed reports, drawn up beforehand, on the five questions submitted for consideration. These were as follows: 1. The final school examination. 2. The international value of degrees. 3. What relative weight ought to be given in schools to classics, modern languages, and science? 4. On the method of teaching modern languages and science in girls' schools. 5. What place should be assigned to economics and social science at the university? The discussions were carried on by men of high intellectual culture; among them we note with pride the name of Dr. W. T. Harris.

The final reports of the sections of the congress were considered in general assemblies of the entire congress, presided over by Monsieur Gréard, the great organizer of secondary education in France. Among the propositions which received the approval of the congress, the following are of great general interest: —

That it is desirable to establish three types of secondary education to be named respectively, Greeco-Latin, Latin-humanities, and Modern.

It is desirable to establish an international equivalence of diplomas, giving the right to proceed from secondary to university education.

It is desirable, as an international practice, to allow law students to pass part of their time at a foreign university.

It is desirable to establish the international equivalence of examinations and courses leading to degrees.

ILLITERACY IN DIFFERENT NATIONS.

According to the Schoolmaster, a census of the illiterates in the various countries of the world, recently published in a foreign journal, places the three slavic states of Roumania, Servia, and Russia at the head of the list, with about eighty per cent. of the population unable to read and write.

Of the Latin-speaking races, Spain heads the list with sixty-three per cent., followed by Italy with forty-eight per cent., France and Belgium having about fifteen per cent. The illiterates in Hungary number forty-three per cent., in Austria, thirty-nine, and in Ireland twenty-one. In England we find thirteen per cent.; Holland, ten per cent.; United

States (white population), eight per cent.; and Scotland seven per cent., unable to read and write.

Among the purely Teutonic states, Switzerland shows the highest proportion of illiterates, viz., two and five-tenths per cent.; in the whole German empire the proportion is but one per cent.; in Sweden, Denmark, Bavaria, Baden, and Wurtemburg, there is practically no one who who cannot read nor write. A. T. S.

BIBLIOGRAPHY OF CURRENT PERIODICAL LITERATURE UPON EDUCATION.

The following bibliography of current periodical literature includes articles upon education and other subjects calculated to interest teachers. Only articles from periodicals not nominally educational are mentioned. Articles of special importance to teachers will, as a rule, be mentioned in notes.

Agnosticism. *Westminster Review*, August.

Air, On change of. Burney Yeo. *Nineteenth Century*, August.

Arnold, Matthew. Parts I. and II. Lord Chief Justice of England. *New Review*, July and August.

Arnold. Matthew Arnold's Influence on Literature. Stephen Henry Thayer. *Andover Review*, September.

Art and Artists, Gounod's views on. Mlle. de Bovet. *Fortnightly Review*, August.

Artists, American, at the Paris Exhibition. Theodore Child. *Harper's*, September.

Bacon, Roger. W. L. Courtney. *Fortnightly Review*, August.

Ballot System, The Australian. Charles Chauncey Binney. *Lippincott's*, September.

Bastille. The Centenary of the. Frederic Harrison. *Contemporary Review*, August.

Bastille, The Taking of the. *Scottish Review*, July.

Translated from the Moniteur newspaper of July 20–23, 23, and 24, 1789.

Berlin Addresses to Students. J. H. W. Stuckenberg. *Our Day*, Aug.

Books, Noticeable. John Morley and others. *Nineteenth Century*, Aug.

Bruno, Giordano. Walter Pater. *Fortnightly Review*, August.

Bruno, Giordano: his life and Philosophy. C. E. Plumptre. *Westminster Review*, August.

Calcutta, Old College Days in. C. T. Buckland. *Longman's Magazine*, August.

Catégories logiques et institutions sociales. G. Tarde. *Revue Philosophique*, August.

Catholic Textbooks, Misleading. Joseph Cook. *Our Day*, August.

Child. George W. Child's Recollections. *Lippincott's*, September.

Contains an account of "the treasures" of the author's library.

Chose en soi, La, dans la philosophie allemande. F. Pillon. *La Critique Philosophique*, July 1, 1889.

College, The Log College and Early Presbyterianism in Pennsylvania. Anne H. Wharton. *Lippincott's*, Sept.

Congress, The Coming. Henry Cabot Lodge. *North American Review*, September.

Conversation, The Art of. Lord Ribblesdale. *Nineteenth Century*, August.

Cowper, William. J. C. Bailey. *Macmillan's*, August.

Creation: The Dawn of, or, the Genesis of the Elements. Farnham Maxwell Lyte. *Westminster Review*, August.

Damien. Les Lépreux des iles Sandwich et le père Damien. Mme. A. Craven. *Le Correspondant*, July 23.

Darwinism, Mr. Wallace on. George J. Romanes. *Contemporary Review*, August.

A valuable article.

Day of Rest, The. Charles Worcester Clark. *Atlantic Monthly*, Sept.

Denken, Das, als Hüflsvorstellungs-Thätigkeit und als Anpassungsvorgang. Johannes Volkelt. *Zeitschrift für Philosophie*, Band 69, Heft 1.

Denominational Schools, Should Americans Educate their Children in? John J. Keane. *Catholic World*, Sept.

A paper read before the National Educational Association at Nashville, July 19, 1889.

Doctrine biologique de M. Delboeuf. La. L. Dauriac. *Revue Philosophique*, August.

Dumas, Alexander. Andrew Lang. *Scribner's*, September.

Economic Changes, Recent. David A. Wells. *Popular Science Monthly*, September.

Economie. Les faits économiques et le mouvement social en Italie. I. Claudio Jannet. *Le Correspondant*, July 23.

Éducation morale, et physique De l', dans les lycées. M. Greard. *Revue Bleue*, July 20.

An important paper.

Educational Reform, Possible and Pressing. J. E. Dwinell. *Our Day*, August.

A plea for character-training in the schools.

Eight Hours' Movement, The. Charles Bradlaugh. *New Review*, July.

Eight Hours the Maximum Working Day. H. M. Hyneman. *New Review*. August.

Elixir of Life, The. Dr. Wm. A. Hammond. *North American Review*, September.

English Literature in American Colleges. James Buckham. *Our Day*, Aug.

Exposition. A travers l', Eugène-Melchior de Vogüé. *Revue des Deux Mondes*, July 1, 15 and Aug. 1, 15.

Female Suffrage, The Appeal against: a Rejoinder. Mrs. Creighton. *Nineteenth Century*, August.

Fitting-School, The Place of the, in American Education. George Trumbull Ladd. *Scribner's*, September.

An interesting and sensible paper. "The true principle of the secondary education does not call for the offer of a great variety of studies, either prescribed or elective, but for a thorough and long-continued discipline in a very few judiciously selected and representative studies."

Flowers and Folks. Bradford Torrey. *Atlantic Monthly*, September.

French Revolutionary Calendar, The. F. Hitchman. *National Review*, Aug.

Geology, Some Modern Aspects of. G. H. Williams. *Popular Science Monthly*, September.

George. Henry George's Mistakes. Thomas G. Shearman. *The Forum*, September, 1889.

A vigorous defence of the single tax system.

Gladstone and the Civilized World. Karl Blind. *Fortnightly Review*, Aug.

Gladstone's Plain Speaking. Lord Brabourne. *Nineteenth Century*, Aug.

Gospel for the Century. Wanted — a. Father Barry. *Nineteenth Century*, August.

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Housekeeping of the Future, The. Helen E. Starrett. *The Forum*, September, 1889.

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Kara Political Prison, The History of. George Kennan. *Century*, Sept.

Kunst und Industrie, Die Austellung des Oesterreichischen Museum's für, in Wien. Julius Lessing. *Deutsche Rundschau*, August.

Liberty of the Subject (Female), The. N. Arling. *Westminster Review*, August.

Libraries. Are Public Libraries Public Blessings? James M. Hubbard. *North American Review*, Sept.

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Life, A study from. Olive Thorne Miller. *Popular Science Monthly*, Sept.

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Lincoln's Restoration Policy for Virginia. Robert Stiles. *Magazine of American History*, September.

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Presents the side of the Liberal-Unionist as opposed to Gladstone.

Lovering, Joseph, Sketch of. *Popular Science Monthly*, September.

Microscopic Foes, Our. A. Winkelried Williams. *Knowledge*, Aug. 1.

Mind, Growth and Decay of. R. A. Proctor. *Knowledge*, August.

Miracles. Walter Lloyd. *Westminster Review*, August.

Moral Instruction of the Young, The. Felix Adler. *The Ethical Record*, July.

A suggestive outline for moral instruction.

Mythology and the Old Testament. Andrew Lang. *New Review*, Aug.

National Library. Growth of a great. Milton T. Adkins. *Magazine of American History*, September.

National museum in München, Das. Adolf Fleischmann. *Unsere Zeit*, Aug.

Nervensystem, Das, und seine Beziehungen zu den Seelenthätigkeiten. Hermann von Meyer. *Deutsche Revue*, August 1889.

Office, The Spoils of. Goldwin Smith. *The Forum*, Sept. 1889.

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Pity, The Luxury of. James Sully. *The Forum*, September, 1889.

An interesting piece of evolutionary psychology.

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Psychologie. Essai d'une terminologie dans les questions d' hypnotisme. *Revue Scientifique*, August 3.

Public Schools, Romanizing the. J. R. Kendrick. *The Forum*, Sept. 1889.

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Reality. What is Reality? IV. The Thing-in-Itself. Fr. H. Johnson. *Andover Review*, September.

Religion of our Boys, The. Austen Pember. *National Review*, August.

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Sabbath in Relation to Civilization, The. John Q. Bittinger. *Andover Review*, September.

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Speech and Song. II. Song. Morell MacKenzie. *Contemporary Review*, August.

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Tennyson's Spiritual Service to his Generation. *Andover Review*, Sept.

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Reminiscences of Cambridge University.

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A careful study of this distinguished statesman.

Women, The Real Rights of. Rose Terry Cook. *North American Review*, September.

Wool-gatherings. Frederic Greenwood. *Nineteenth Century*, August.

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AMONG THE BOOKS.

THE CENTURY DICTIONARY. An Encyclopedic Lexicon of the English Language. Prepared under the supervision of William Dwight Whitney, Ph. D., LL. D., Professor of Sanscrit and Comparative Philology in Yale University. Vol. 1, A to C. New York: The Century Co. 1889. Price, $10 per volume.

The first volume of the greatest general dictionary ever undertaken in English or any other language is out. Of the amount of matter which will be found in this work when completed, one can form some idea when it is said that this volume of twelve hundred pages, and nearly as much matter as Webster's latest edition, is but the dictionary of words beginning with A and B, and about one-half of those beginning with C.

The work done in this volume has been not only immense in amount, but of wide range and will be found of great accuracy. The completeness of the work is shown by a comparison of the amount of matter given under A as a word and as a prefix. In Webster this is given under five divisions, occupying a space of one hundred sixty-six square inches, while the Century has 1,097 square inches of matter under twenty-four divisions.

The work on orthography and pronunciation is the particular work of Prof. W. D. Whitney; that on synonyms of Prof. H. M. Whitney; and the other special lines, of which there are about thirty, are taken by specialists of the highest authority in their several lines of work.

In the comparison of the completeness of the work of this Dictionary with all works of similar character heretofore published, it is only necessary to say that words of American origin are fully discussed and a single illustration will serve to show the work put into them.

The word *boom* in its new sense is not given at all in Webster, but here is given the word, its meaning, the origin of this use of it, and several words which have grown from it.

The editors of the Century Dictionary have given much time and careful attention to the derivation of new words, and have sought to give the names of their inventors. Many errors in previous works, even in the latest editions of our standard dictionaries have been here shown and corrected.

The work from the standpoint of the scholar is of the very highest order, but this volume is also of an equally high standard, looked at with the eyes of a book printer and binder.

The type, including that used for the headings, that used in the definition and discussion of each word, the illustrative quotations and the italics, is of a particularly fine character. The cuts and engravings, which were produced under the direction of William Lewis Fraser, are very finely done, and evidently the result of much study. The presswork and the paper could scarcely be better, and the binding is in keeping with the whole interior of the volume.

FIFTY-SECOND ANNUAL REPORT OF THE BOARD OF EDUCATION, together with the Fifty-Second Annual Report of the Secretary of the Board. 1887–'88.

Beside the Report of the Board, this volume contains Reports of Visitors to the Normal Schools, the Secretary's Report, the Reports of the five Agents of

the Board, together with an outline of a Course in Design for the Public Schools, Report of the Natural History Camp at Lake Quinsigamond, Worcester, Report on Physical Culture in Schools, by a committee of the Massachusetts Medical Society, Reports of the Massachusetts Institute of Technology and Worcester Polytechnic Institute, and one hundred thirty-six pages of tables of statistics.

That portion of the Secretary's Report under the heading, "The Ends and Means of Public Instruction," discussing with much force such subjects as "Physical Education," "Intellectual Education," and "Moral Education," should be carefully studied by every teacher in the country.

The Bureau of Education have recently published under the general title of Circulars of Information, the following pamphlets of great worth, and valuable especially to those who wish to know something of the past and present conditions of education in the various states of this country: —

They are THE HISTORY OF EDUCATION IN NORTH CAROLINA, by Charles Lee Smith, Fellow in History and Politics, Johns Hopkins University; HISTORY OF HIGHER EDUCATION IN SOUTH CAROLINA, by Colyer Merriwether, A. B., Johns Hopkins University; EDUCATION IN GEORGIA, by Charles Edgeworth Jones, Augusta, Ga., late graduate student Johns Hopkins University; HISTORY OF EDUCATION IN FLORIDA, by George Gary Bush, Ph. D.; HIGHER EDUCATION IN WISCONSIN, by William F. Allen and David E. Spencer, University of Wisconsin.

These "Contributions to American Educational History" are under the editorial supervision of Prof. Herbert B. Adams.

PRINCIPLES OF THE HISTORY OF LANGUAGE. By Hermann Paul, Professor of the German Language and Literature in the University of Freiburg. Translated from the second edition of the original, by H. A. Strong, M. A., LL. D., Professor of Latin in University College, Liverpool. New York: Macmillan & Co. Pp. 512. Price, $3.00.

In this large work the linguist and student of language will find very much to interest him and much which will be of very great value. The twenty-three chapters are well arranged, and the line of thought and manner of its development are logical, beginning with some "General Observations on the Nature of the Development of Language," and continuing to the consideration of "The Common Language." To quote from Professor Wheeler in the preface to the American edition, "As the first work of its kind, its appearance may safely be said to determine a distinct period in the development of the science."

PAPERS OF THE AMERICAN HISTORICAL ASSOCIATION. Vol. III., No. 2. Report of the Proceedings of the American Historical Association in Washington, D. C., Dec. 26–28, 1888. By Herbert B. Adams, Secretary of the Association. New York and London: G. P. Putnam's Sons. Paper. Pp. 292. Price, $1.50.

Students of American History will be very much pleased that these papers have been published. Among the subjects treated are "The Early Northwest," by William F. Poole, LL. D.; "The Place of the Northwest in General History," by Prof. Wm. F. Allen; "The Old Federal Court of Appeals," by Prof. J. Franklin Jameson, Brown University; "The State-Rights Conflict over the Public Lands," by Pres. James C. Welling, LL. D., Columbia University, and many others of as great interest, and by as distinguished authorities.

NUMBERS UNIVERSALIZED; AN ADVANCED ALGEBRA. By Prof. David M. Sensenig, M. S., State Normal School, West Chester, Pa. New York: D. Appleton & Co. Part 1. Cloth. Pp. 353.

This book is intended for use as an advanced elementary algebra, and will also form the first part of a higher algebra soon to be published. The simplicity of the Elementary Algebra "Numbers Symbolized," is lacking in this book, as it should be, and the definitions are exact and concise, while illustrations are omitted as much as is wise. The arrangement of subjects and topics is rather an innovation in some respects, though perhaps not too much so. Instructors in mathematics will wish to examine this book at once.

THE ACADEMIC ALGEBRA. By William F. Bradbury, A. M., Head Master Cambridge Latin School, and Grenville C. Emery, A. M., Master in the Boston Latin School. Boston: Thompson, Brown & Co. Half leather. Pp. 414.

Here we have another and more advanced book in the Eaton-Bradbury Mathematical Series. This series has been so well known and so widely used that we should have expected as good a book from the authors as the one which is before us. The object of the book is evidently to give three things not given in many books on this subject, viz.: complete treatment of factoring, large number of practice examples, and more advanced work to meet the modern requirements for admission to many colleges. Preparatory schools particularly will appreciate this new book.

ELEMENTARY TRIGONOMETRY, PLANE AND SPHERICAL. By Edwin P. Seaver, A. M., Superintendent of the Public Schools of Boston, formerly Assistant Professor of Mathematics in Harvard University. New York: Taintor Bros. & Co. Half leather. Pp. 284.

The book is divided into three parts; the first three chapters being intended to furnish a very brief practical course in plane Trigonometry. The next four chapters present the subject of Trigonometric Functions in the manner in which every student of advanced mathematics should have mastered it. The last four chapters are devoted to Spherical Trigonometry, and are followed by an appendix which ends with a complete key to the examples in the book.

ELEMENTARY LESSONS IN HEAT. By S. E. Tillman, Professor of Chemistry, United States Military Academy. Philadelphia: J. B. Lippincott Co. Cloth. Pp. 160. Price, $1.80.

For Polytechnic and Technical schools, and in any institution where a careful study of Heat and its uses, effects and capacity, is desired, this work will prove an aid of much value.

The eleven chapters upon such subjects as Thermometry, Dilation of Bodies, Calarimetry, Hygrometry, Conduction, Radiation, Thermo-Dynamics, etc., etc., are all work which has been gone through with by Professor Tillman, at West Point.

PRACTICAL LATIN COMPOSITION. By William C. Collar, A. M., Head Master Roxbury Latin School. Boston and London: Ginn & Co. Cloth. Pp. 268. Price, $1.10.

We shall be much surprised if this well-known instructor in Latin has not here produced a book which will meet with a very hearty reception from both the teachers and students of Latin Composition.

The plan of the book is new, the style is excellent, the vocabulary very complete, the typography of a high order, and the whole book one which we, as well as the author and publishers, may well be pleased with.

EURIPIDES IPHIGENIA AMONG THE TAURIANS. Edited by Isaac Flagg. Boston and London: Ginn & Co. Cloth. Pp. 197. Mailing price, $1.50.

This book is another of the "College Series of Greek authors," edited under the supervision of Professors John Williams White and Thomas D. Seymour, which have lately been issued by this publishing house, and which have met with so hearty a reception at the hands of classical students.

The work in this volume is of the same high order as that in the previous issues of the series, and will be as gladly received.

THE IRREGULAR VERBS OF ATTIC; their Forms, Prominent Meanings, and Important Compounds; with lists of Related Words and English Derivations. By Addison Hogue, Professor of Greek, University of Mississippi. Boston: Ginn & Co. Cloth. Pp. 268. Introduction price, $1.50.

The material treated in this book is here much fuller than in the lists of irregular verbs in the grammars, and much more accessible than in the lexicons.

The book contains after the Regular Verbs, — pure, mute, and liquid, — the Irregular Verbs of Attic Prose in alphabetical order. Prominent meanings and special uses of frequent occurrence are given, often illustrated by translated examples. The most important compounds are added, and also many related words, — forming a very practical sort of introduction to word-formation. The first declension alone is represented by about 400 substantives, and this indicates the range of vocabulary. The English Derivatives, of which there are over 450, will prove, an attractive feature to teachers and students alike. To the latter they will be an additional support in learning some five or six hundred Greek words, and will broaden their knowledge of their own tongue.

DEUTSCH'S DRILLMASTER IN GERMAN. Based on Systematic Gradation and Steady Repetition. By Solomon Deutsch, A. M., Ph. D. Author of "Letters for Self-Instruction in German," etc. New York: The Baker & Taylor Co., Publishers. 12mo. Cloth. Pp. 469. Price, $1.75.

This book does not claim to do away with the actual work required to learn the German language, but to reduce that work to its minimum. Its method is a new and successful application of the well-known pedagogic principles of gradation and repetition to language learning. But one difficulty is presented at a time, and this is diminished as much as possible. A beginning is made with sentences of the simplest form, and such as contain words similar to the English in both sound and meaning.

The work is based on well ascertained pedagogical principles, and contains a wealth of equivalent idiomatic expressions in both languages, and thus offers the student of German an opportunity of mastering the language by a system of easy and natural drill.

ONE YEAR COURSE IN GERMAN. Adapted to the wants of Students in Preparatory and High Schools, fitting for the leading Colleges. By Oscar Faulhaber, Ph. D., Phillips Exeter Academy. Second edition. Blue cloth. Pp. 197. Boston: D. C. Heath & Co.

This book, as its title page states, is adapted for students who are preparing to enter any of the leading colleges. The grammar contained in this book is what is necessary to meet the requirements of most, if not all of the colleges of America. The reading matter is graded, containing prose selections from well-known modern authors. Many academies and high schools will adopt this work.

ONFEL UND NICHTE; A German story for sight translation. By Oscar Faulhaber, Ph. D., Phillips Exeter Academy. Boston: D. C. Heath & Co.

This story is calculated to give the student, together with an excellent vocabulary, a clear picture of German life in the various grades of society, including the political, military, and civil phases of modern Germany.

DIE BRAUNE ERICA. A novel. By Wilhelm Jenfen, with English notes by E. E. S. Joynes, of the University of South Carolina. Boston: D. C. Heath & Co.

Classes in German will find in this little book an interesting story, and also much good practice in reading the language.

PAGES CHOISIES DES MEMOIRES DU DUC DE SAINT-SIMON. Edited and Annotated by A. N. Van Daell, Professor of Modern Languages, Massachusetts Institute of Technology. Late Director of Modern Languages, Boston High School. Boston: Ginn & Co. Cloth. Pp. 237. Price, 75 cents.

Professor Van Daell is certainly right when he advises the study of the Master Minds of French Literature in the study of the French language.

Saint-Simon was indeed one of these master minds, and though his grammar was not in all particulars exact, and his sentences not always properly constructed, he is one whose writings are well worthy the study of the youth of America.

MEMORIA SOBRE LA INSTRUCCION EN EL ESTADO DE YUCATAN. Por Radolfo Menéndez. Merida, Tipografia De G. Canto. 1889.

This report gives a very full and really excellent report of the condition of public instruction in that state. The courses in the schools are given, showing not more difference from the average New England school of similar grade than exists between many schools in this country.

ELENE. An Old English Poem. Edited, with Introduction, Latin Original, Notes, and complete Glossary, by Charles W. Kent, M. A., Ph. D., Professor of English and Modern Languages in the University of Tennessee. Boston and London: Ginn & Co. Cloth. Pp. 149. Price, 65 cents.

Students of early English will be much gratified with the publication of this poem of the eighth century. The introduction contains a discussion of the manuscript, the author and his life as far as known, the theme, plan, and literary merit of the poem, study of the meter of the poem, and a bibliography. Following the poem are several pages of notes, and an unusually complete glossary.

LIGHT GYMNASTICS. A Guide to Systematic Instruction in Physical Training. For use in Schools, Gymnasia, etc. By William G. Anderson, M. D., F. S. S. New York: Effingham, Maynard & Co. Fully illustrated. Cloth. Pp. 234. Price to teachers, $1.50.

There is little really new and original in this book. There are a few movements with and without apparatus which we have not seen, which Doctor Anderson describes and illustrates by means of diagrams.

The book will be of interest to such teachers who are at sea when brought face to face with the subject of physical exercise for pupils during school hours, where such exercise must be taken indoors. The principles given in this book in regard to the taking of exercise, and the care of the muscles of the body, should be known by every teacher.

THE STUDENT'S OUTLINE HISTORICAL MAP OF ENGLAND. By Thos. C. Roney, A. M., Instructor of History in Dennison University. Boston, New York and Chicago: D. C. Heath & Co.

This map, on strong manilla paper, 40 x 48 inches in size, will be found of value to students of English History. It gives the outlines of the present county divisions, and the divisions into Earldoms and Vassal Kingdoms of the tenth and eleventh centuries.

WASHINGTON'S LETTER TO BENJAMIN HARRISON, Governor of Virginia, in 1784, on the Potomac navigation scheme and the general question of the opening of the West, has just been added by the directors of the Old South Studies in History to their new general series of Old South Leaflets. They have also added *Washington's Circular Letter to the Governors of the States*, on disbanding the army, in 1783 — a letter which Washington himself felt to be so important that he termed it his "legacy" to the American people, and which discusses the political problems of the time so seriously and thoroughly that it should be read everywhere today along with the Farewell Address. The *Farewell Address* (No. 4), and the *First Inaugural* (April 30, 1789), (No. 10), have already appeared in this series of Old South Leaflets, which now numbers sixteen issues, each costing only five cents. The presentation of these important papers in this cheap form is a notable means of popular education in history. All the leaflets are accompanied by useful notes by Mr. Edwin D. Mead, the editor of the series. The notes accompanying the *Letter to Governor Harrison*, a letter of which far too little is known, show that no man of that time was so sagacious and far-sighted with regard to the future of the great West as Washington. These leaflets should be read by everybody at this Washington Centennial time. They are published by D. C. Heath & Co., Boston, New York and Chicago.

A READER IN BOTANY. Part 1. From Seed to Leaf. Selected and adapted from well-known authors, by Jane H. Newell. Boston: Ginn & Co. Cloth. Pp. 209. Price, 70 cents.

While not intended to be a complete book by itself, it is admirably adapted to awaken and keep in proper condition the enthusiasm of the student of botany. Its compiler has well arranged the chapters for reading in connection with the study of her "Outlines of Botany," recently published by Ginn & Co. Among the authorities quoted are such botanists as Anton Kerner Von Marilann, Julius Von Sachs, Charles Darwin, and Joseph Davier Saintine. Students in grammar or high schools will find this book of much interest and assistance to them in their study of this very attractive subject.

AUTOBIOGRAPHY OF FRIEDRICH FROEBEL. Translated and annotated by Emilie Michaelis, Head Mistress of the Croydon Kindergarten and Preparatory School, and H. Keatley Moore, Mus. Bac., B. A., Examiner in Music to the Froebel Society, and Vice Chairman of the Croydon Kindergarten Company. Cloth. Pp. 167. Price, $1.50.

While this is incomplete as a life of Froebel, it will be very gladly received by those kindergarteners who have looked, heretofore so nearly in vain, for something which would give them an insight into the life and habits, and particularly the thoughts and feelings of this man who has done so much for the children of today.

The book is made up of two long autobiographical letters, one to the Duke of Meiningen, and one to Kranse, together with many notes and explanations by the editors, chronological abstract of Froebel's life, and a bibliography of Froebel.